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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

RICOH COMPANY, LTD.,

Plaintiff,

vs.

AEROFLEX INCORPORATED, et al.,

Defendants.

Case No. CV 03-04669 MJJ

**DECLARATION OF KENNETH W.
BROTHERS IN SUPPORT OF PLAINTIFF
RICOH'S OPPOSITION TO DEFENDANTS'
MOTION TO STAY**

I, Kenneth W. Brothers , hereby declare as follows:

1. I am an attorney at law licensed to practice in the District of Columbia and licensed to practice *pro hac vice* in the State of California and am a partner in the law firm of Dickstein Shapiro Morin and Oshinsky, LLP, attorneys for the Plaintiff Ricoh Company, Ltd. ("RicoH"). The matters set

1 forth in this declaration are based upon my personal knowledge and, except where otherwise indicated,
2 and if called as a witness, I could and would testify competently thereto.

3 2. Attached hereto as Exhibit 1 is a true and correct copy of the Memorandum in Support of
4 Defendants' Motion to Stay or, in the Alternative, Transfer Venue served on June 12, 2003.

5 3. Attached hereto as Exhibit 2 is a true and correct copy of U.S. Patent Number 4,922,432
6 issued May 1, 1990.

7 4. Attached hereto as Exhibit 3 is a true and correct copy of the Synopsys Objections and
8 Responses to Plaintiff's Deposition Subpoena, served November 12, 2003.

9 5. Attached hereto as Exhibit 4 is a true and correct copy of *Mitsubishi Electric Corp. v.*
10 *IMS Technology*, 1996 U.S. Dist. LEXIS 12239 (N.D. Cal. 1996).

11 6. Attached hereto as Exhibit 5 is a true and correct copy of *American Academy of Science*
12 *v. Novell, Inc.*, 1992 U.S. Dist. LEXIS 20145; 24 U.S.P.Q.2D (BNA) 1386.

13 7. Attached hereto as Exhibit 6 is a true and correct copy of *Zemel Bros., Inc. v. The Dewey*
14 *Electronics Corp.*, 1982 U.S. Dist. LEXIS 10201; 218 U.S.P.Q. (BNA) 722.

15
16 I declare under penalty of perjury under the laws of the United States of America that the
17 foregoing is true and correct. This declaration was executed in Washington, DC on November 25, 2003.

18
19 _____/s/

20 Kenneth W. Brothers
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**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

RICOH COMPANY LTD.,

Plaintiff,

v.

AEROFLEX, INC., ET AL.,

Defendants.

Civil Action No. 03-0103-GMS

**MEMORANDUM IN SUPPORT OF DEFENDANTS'
MOTION TO STAY OR, IN THE ALTERNATIVE, TRANSFER VENUE**

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Dated: June 12, 2003

TABLE OF CONTENTS

TABLE OF AUTHORITIES	ii
I. NATURE AND STAGE OF PROCEEDINGS	1
II. SUMMARY OF ARGUMENT	1
A. The Court Should Stay The Present Action	2
B. The Court Should Transfer The Present Action to the Northern District of California for Consolidation with the Synopsis Case.....	3
III. FACTUAL BACKGROUND	6
IV. ARGUMENT	9
A. As a suit against Synopsys' customers, this litigation should be stayed pending the outcome of the California <i>Synopsys</i> case.....	10
B. Since "forum shopping" alone motivated Ricoh's selection of Delaware, this litigation should be stayed pending the outcome of the California Synopsys case.	13
C. If not stayed, this litigation should be transferred to the Northern District of California pursuant to 28 U.S.C. § 1404.....	13
1. Ricoh could have brought this litigation in the Northern District of California.....	15
2. The balance of convenience factors strongly favors transfer to the Northern District of California.	15
V. CONCLUSION.....	20

TABLE OF AUTHORITIES

Cases

<i>Affymetrix, Inc. v. Synteni, Inc.</i> , 28 F. Supp. 2d 192 (D. Del. 1998)	14, 15, 17, 19
<i>Allergan, Inc. v. Alcon Labs., Inc.</i> , 2003 U.S. Dist. LEXIS 2564 (D. Del. Feb. 25, 2003) (C.A. No. 02-1682-GMS)	15
<i>AT&T Corp. v. Public Serv. Enters. Of Pa., Inc.</i> , 2000 U.S. Dist. LEXIS 4649 (E.D. Pa. 2000) (C.A. No. 99-4975)	11
<i>ATSPI, Inc. v. Sharper Image, Inc.</i> , 677 F. Supp. 842 (W.D. Pa. 1988)	12
<i>Crawford v. West Jersey Health Sys.</i> , 847 F. Supp. 1232 (D.N.J. 1994)	11
<i>Crosley Corp. v. Hazeltine Corp.</i> , 122 F.2d 925 (3d Cir. 1941), <i>cert. denied</i> , 315 U.S. 813, 86 L. Ed. 1211, 62 S. Ct. 798 (1942)	11
<i>E.E.O.C. v. University of Pennsylvania</i> , 850 F.2d 969 (3d Cir. 1988), <i>aff'd</i> , 493 U.S. 182 (1990)	10, 11
<i>GPAC, Inc. v. D.W.W. Enters., Inc.</i> , 144 F.R.D. 60 (D.N.J. 1992)	11
<i>IKOS Systems, Inc. v. Cadence Design Systems, Inc.</i> , 2002 U.S. Dist. LEXIS 20574, (D. Del. 2002 (C.A. No. 02-1335-GMS)	5, 15, 19
<i>Intel Corp. v. ULSI Corp.</i> , 995 F.2d 1566 (Fed. Cir. 1993)	12
<i>Jumara v. State Farm Insurance Co.</i> , 55 F.3d 873 (3 rd Cir. 1995)	14, 15, 16
<i>Kahn v. General Motors Corp.</i> , 889 F.2d 1078 (Fed. Cir. 1989)	3, 11, 13
<i>Katz v. Lear Siegler, Inc.</i> , 909 F.2d 1459 (Fed. Cir. 1990)	3, 11
<i>Landis v. North American Co.</i> , 229 U.S. 248 (1936)	10
<i>Mentor Graphics Corp. v. Quickturn Design Sys., Inc.</i> , 77 F. Supp. 2d 505 (D. Del. 1999)	16, 17, 19
<i>Panavision Int'l, L.P. v. Toeppen</i> , 141 F.3d 1316 (9 th Cir. 1998)	15

<i>Refac International, Ltd., v. IBM,</i> 790 F.2d 79, <i>aff'd on reconsideration in relevant part by</i> 798 F.2d 459 (Fed. Cir. 1986)	12
<i>Remington Rand Corporation v. Business Systems, Inc.,</i> 830 F.2d 1274 (3d Cir. 1987)	10
<i>Whelen Technologies, Inc. v. Mill Specialties, Inc.,</i> 741 F. Supp. 715 (N.D. Ill. 1990)	12
<i>William Gluckin & Co. v. International Playtex Corp.,</i> 407 F.2d 177 (2d Cir. 1969)	11

Statutes

28 U.S.C. § 1391	15
28 U.S.C. § 1400	15
28 U.S.C. § 1404	passim

I. NATURE AND STAGE OF PROCEEDINGS

On January 21, 2003, Ricoh Company Ltd. ("Ricoh") filed this patent infringement suit against Aeroflex Incorporated ("Aeroflex"), AMI Semiconductor, Inc. ("AMIS"), Matrox Electronic Systems Ltd. ("Matrox"), Matrox Graphics Inc. ("Matrox Graphics"), Matrox International Corp. ("Matrox Int'l"), and Matrox Tech, Inc. ("Matrox Tech") (collectively "Defendants"). Ricoh alleges that each of the Defendants infringes its U.S. Patent No. 4,922,432 (the "'432 patent") by "using, offering to sell, and/or by selling and/or importing into the United States application specific integrated circuits designed by or using information generated by, the process" described in the '432 patent.

The Defendants hereby move the Court to stay this action or, in the alternative, to transfer this action to the United States District Court for the Northern District of California pursuant to 28 U.S.C. § 1404.

II. SUMMARY OF ARGUMENT

In this litigation, Ricoh, a company with virtually no connection with Delaware, has sued six companies, also with virtually no connection with Delaware, for patent infringement involving complex logic synthesis technology. It cannot be disputed that Ricoh has brought this suit in a district in which:

1. none of the parties has its principal place of business;
2. none of the inventors reside;
3. none of the inventions were made.
4. no potential witness for any party resides;
5. neither party maintains a facility;
6. no documents of the parties are maintained in the regular course of business;

7. no research, development or manufacturing of the accused products has ever taken place; and
8. none of the relevant third-party testimony or documents related to prior art exists.

Furthermore, Synopsys, Inc. ("Synopsys"), the real target in this patent infringement litigation, has filed suit in the more appropriate forum of the Northern District of California seeking declaratory judgment that the '432 patent is invalid and its Synopsys' Design Compiler product does not infringe the '432 patent ("Synopsys case"). Because resolution of the Synopsys case will resolve all issues in this litigation, and because the Northern District of California is a more convenient forum for litigation of the relevant issues in the present case, this action should be stayed pending the resolution of the Synopsys case.

In the alternative, the Court should transfer this action to the Northern District of California for consolidation with the Synopsys case because of (1) the grave injustice that would result in forcing Defendants to litigate in a forum where numerous third-party witnesses necessary to their defense are not subject to the subpoena power of the court and (2) the substantial savings of judicial and party resources that would result.

A. The Court Should Stay The Present Action

Although Synopsys is not named as a defendant in the present case, it is the real target of Ricoh's patent infringement allegations. Ricoh has indicated, in several different statements made by its counsel, that its infringement allegations are based on Defendants' use of Synopsys' Design Compiler software as part of their engineering processes. In a declaratory judgment action filed May 15, 2003 in the Northern District of California, Synopsys has sought a determination that Design Compiler does not, in

fact, infringe the patent that is the basis of Ricoh's suit here in Delaware.¹ See Ex. A. to Declaration of Erik K. Moller ("Moller Decl.").² Synopsys' declaratory judgment action will inevitably resolve the dispute between Ricoh and Synopsys' customers: either Synopsys will prevail and use of Design Compiler will be determined to be non-infringing or Ricoh will prevail and Synopsys will be forced to pay damages or take a license to the Ricoh patent, in which case Synopsys' customers will be immunized from liability under the doctrine of "patent exhaustion."

Litigation against or brought by a manufacturer of infringing goods takes precedence over a suit by the patent owner against customers of the manufacturer. See *Katz v. Lear Siegler, Inc.*, 909 F.2d 1459, 1464 (Fed. Cir. 1990). This is especially true where, as here, plaintiff's choice of venue was dictated by forum shopping in a blatant attempt to select a venue where critical third party witnesses for the defense are not subject to the subpoena power of the Court in plaintiff's selected forum. See *Kahn v. General Motors Corp.*, 889 F.2d 1078, 1081 (Fed. Cir. 1989). Defendants, therefore, request that the current action be stayed, pending resolution of the underlying patent dispute in the Northern District.

B. The Court Should Transfer The Present Action to the Northern District of California for Consolidation with the Synopsys Case.

In the alternative, Defendants request that the Court transfer this case to the Northern District of California pursuant to 28 U.S.C. § 1404 for consolidation with the

¹ Defendants originally intended to file this motion soon after filing the complaint in the Synopsys case. However, filing this motion was delayed by Ricoh's counsel's refusal to accept service of process of the summons and complaint in the Synopsys case and by Ricoh's officers avoidance of acceptance of service. See Moller Decl. at ¶¶3-4.

² Referenced exhibits are attached to the Moller Decl. unless otherwise indicated.

Synopsys case. Ricoh could have brought this case in the Northern District, and the dispute between Ricoh and Synopsys is more closely tied to events and persons in California than it is to Delaware. No acts of infringement are alleged to have taken place in Delaware. None of the parties or relevant third party witnesses has a substantial presence in Delaware. Numerous third parties critical to Defendants' case and their defenses of noninfringement, invalidity and equitable estoppel are resident in the Northern District of California and are outside the subpoena power of this Court.

California's interest in the suit arises from the fact that Synopsys and Knowledge Based Silicon Corporation ("KBSC"), a former assignee of the '432 patent, have an earlier history of dealings that took place in California. Synopsys' complaint contends that KBSC, an assignee of the Kobayashi patents, originally approached Synopsys to demand that it license these patents in 1991 during the annual meeting of the Design Automation Conference in San Francisco, California. When Synopsys declined to take a license, KBSC abandoned their efforts for twelve years, and instead pursued cooperative contractual relationships with Synopsys. Synopsys intends to argue, based on these facts, that Ricoh is equitably estopped from seeking to enforce the Kobayashi patents against Synopsys or licensed users of its software. *See* Ex. A at ¶¶10-11, 25-29.³

Furthermore, California is a more convenient jurisdiction for this litigation. The Electronic Design Automation ("EDA") industry grew up in the Northern District of California and is now, in effect, resident there. Synopsys and its most significant competitors, including Cadence Design Systems and Monterey Design Systems, are all headquartered in the Northern District and maintain their principal engineering facilities

³ Defendants intend to seek leave of court to amend their first amended answer to plead the defense of inequitable conduct.

there. The University of California at Berkeley and Stanford University are pre-eminent centers of research on design synthesis issues and have many of the authorities in the field on their faculty. This unique concentration of the EDA industry within the Northern District of California was previously recognized by this Court in its decision in *IKOS Systems, Inc. v. Cadence Design Systems, Inc.*, where the Court relied on the fact that the industry was “located in the Silicon Valley” as part of the basis for a transfer to the Northern District. *See IKOS Systems, Inc. v. Cadence Design Systems, Inc.*, C.A. No. 02-1335-GMS, 2002 U.S. Dist. LEXIS 20574, at *5 (D. Del. Oct 21, 2002 (Ex. G)).

The only connection Defendants have to Ricoh’s allegations of patent infringement against Design Compiler is the fact that some of the Defendants use Design Compiler in their business. The detailed factual questions about the operation of Synopsys’ Design Compiler raised by Ricoh’s patent infringement allegations can only be answered by Synopsys and not by Defendants in this case, who possess no substantive information about the operation of Design Compiler. *See* Declaration of Julie McManus at ¶7 (“McManus Decl.”). Given that Ricoh’s allegations against Defendants will inevitably be resolved by the action brought directly by Synopsys in the Northern District of California, and that most, if not all, of the witnesses necessary to the defense of this case reside in the Northern District of California and are outside the subpoena power of this court, Defendants respectfully submit that it is appropriate for the Court to stay the present proceeding until Ricoh’s patent infringement allegations can be litigated to resolution in the Northern District of California. If the Court is unwilling to stay the present case, Defendants request that this matter be transferred, pursuant to 28 U.S.C. § 1404 to the Northern District of California so that it can be joined or otherwise coordinated with Synopsys’ declaratory judgment action.

III. FACTUAL BACKGROUND

The facts of this action clearly establish that Delaware has only a passing interest in this matter, and that the most convenient forum for this litigation is in the United States District Court for the Northern District of California.

This case is a patent infringement action involving the technology involved in the design of application specific integrated circuits (ASICs). ASICs are microelectronic devices that electronics manufacturers design for a specific function, for example for use in graphics and telecommunications devices. As ASICs have become more complicated, their design has become more difficult.

Importantly, neither the parties nor any of the relevant third parties have a substantial presence in Delaware. None of the Defendants have a substantial presence in Delaware. Aeroflex Incorporated ("Aeroflex") is a high technology company that designs, develops, manufactures and markets a diverse range of microelectronic, and test and measurement products for use in communication systems, networks and automatic test systems. Aeroflex has its principal place of business in Plainview, New York. *See* Declaration of Charles Badlato at ¶2 ("Badlato Decl."). AMI Semiconductor, Inc. ("AMIS") is a high technology company that designs, develops, and manufactures a broad range of integrated circuit (IC) products for a number of end-uses including automotive, medical, industrial, communications, computing, defense and consumer products. AMIS has its principal place of business in Pocatello, Idaho. *See* Declaration of Jon Stoner at ¶2 ("Stoner Decl."). The Matrox defendants are high technology companies that design software and hardware solutions in the fields of graphics, video editing, image processing and new business media. Matrox Electronic Systems Ltd. ("Matrox") and Matrox Graphics, Inc. ("Matrox Graphics") have their principal places of business in Dorval,

Quebec, Canada. Matrox International, Inc. ("Matrox Int'l") has its principal place of business in Plattsburg, New York. Matrox Tech, Inc. ("Matrox Tech") has its principal place of business in Boca Raton, Florida. See Declaration of André Desbiens at ¶¶2-4 ("Desbiens Decl.").

Plaintiff does not have a substantial presence in Delaware. Ricoh is a high technology corporation that manufactures digital office equipment, including color and black & white digital copiers, printers, facsimile machines, scanners, and digital cameras. Ricoh has its principal place of business in Tokyo, Japan. On information and belief, the technologies described in the '432 patent were developed in South Carolina. While it does not appear to have any facilities in Delaware, Ricoh has six subsidiaries in California, including three within the Northern District of California, Ricoh Innovations, Inc. in Menlo Park, Ricoh Corporation Office Solutions and Systems Development Group in San Jose, Ricoh Silicon Valley, Inc. in Cupertino. See Moller Decl. at ¶¶5-6.

Finally, none of the relevant third parties necessary to the defendant's case are within the subpoena powers of this Court. Ricoh filed this suit on January 21, 2003 alleging that each of the Defendants infringes the '432 patent. The precise nature of the Defendants' infringing actions is not described in the complaint. However, in correspondence, Ricoh implies that the Defendants' infringing activities are their use of Synopsys' computer-aided design systems:

We are writing to you on behalf of Ricoh Company Ltd. because we are aware that your company is involved with the design of custom ICs that include application specific designed circuitry. We understand that in designing these circuits, you use a computer-aided design system obtained from Synopsys, including *Design Compiler*.

As you may know, Ricoh owns two of the basic patents directed to computer-aided design processes. These are U.S. Patent Nos. 4,922, 432 and 5,197,016. They cover significant advances in computer-aided design

processes for designing custom designed ICs for specific applications directly from architecture independent functional specifications for the integrated circuit.

Moller Decl., Ex. D (emphasis added).

Ricoh's allegations in its complaint and correspondence clearly implicate individuals at Synopsys who are involved with the design of Synopsys' computer-aided design products. Third party Synopsys is a designer and manufacturer of high-level design automation solutions for the design of integrated circuits, systems on a chip (SoCs) and electronic systems. Synopsys sells its products to semiconductor, computer, communications, consumer electronics and aerospace companies, including all of the Defendants. *See* McManus Decl. at ¶2. Synopsys has its principal place of business in Mountain View, California. *See id.* at ¶3. As with the parties to this action, Synopsys does not have a substantial presence in Delaware. *See id.* at ¶4. Synopsys' engineering staff, whose knowledge of Design Compiler will be essential to resolution of this case, are located in Northern California. *See id.* at ¶¶5-6.

Synopsys' employees and former employees with critical information regarding the development of Design Compiler and the '432 patent assignee's earlier efforts to license the patent-in-suit to Synopsys, and the abandonment of those efforts, are located in the Northern District of California. First, representatives of Knowledge Based Silicon Corporation ("KBS"), an assignee of the '432 patent met with Synopsys employees in 1991 urging Synopsys to take a license to the Kobayashi patents. Synopsys did not take a license, and KBS abandoned its efforts. *See id.* at ¶8; Moller Decl. at ¶10. This testimony is necessary to Defendants' equitable estoppel defense. Second, David Gregory, a former employee of Synopsys and currently the CEO of ReShape, Inc. in

Mountain View, California, is a primary architect of Design Compiler and has valuable testimony regarding the operation of that product. *See* McManus Decl. at ¶¶9-10.

In addition, on information and belief, the inventors of the patent in suit do not reside in Delaware. The inventors on the '432 patent are Hideaki Kobayashi and Masahiro Shindo. The Defendants believe that both inventors currently reside in Japan and do not work for Ricoh, and are therefore outside the subpoena power of this Court. Dr. Hideaki Kobayashi, who is named as one of the inventors on the patent at issue in the present case, currently serves as Chairman of Knowledge Edge, K.K., which runs a training program for Japanese engineers out of offices in Mountain View, California, within the Northern District. *See* Moller Decl. at ¶9.

Furthermore, many of the witnesses knowledgeable about prior art to the '432 patent are outside the subpoena power of this Court. It is well known that the electronic design automation industry, the relevant industry to the patent in suit, is based in the Silicon Valley in California. Therefore, in addition to witnesses at Synopsys, the Defendants anticipate requiring testimony from many individuals who reside in northern California and outside the subpoena power of this Court. Many individuals who developed the early logic synthesis systems that will be relevant in this case are located in the Northern District of California. *See* Moller Decl. at ¶11.

IV. ARGUMENT

This patent infringement litigation was brought by Ricoh against three groups of companies without any relationship to each other.⁴ The only common thread among these companies is that Ricoh alleges that they all use Synopsys software to design ASICs. As

⁴ The Matrox defendants are related companies, but have no relationship with Aeroflex or AMI.

such, the Defendants are merely proxies for Synopsys, the real party in interest. Because Synopsys has filed its own action against Ricoh in the Northern District of California for declaratory judgment on the patent-in-suit here, all issues in this case will be definitively resolved by the California Synopsys case. Therefore, this case should to be stayed pending the outcome of the Synopsys case. In the event this case is not stayed, it should be transferred to the Northern District of California, which is a more convenient forum.

A. As a suit against Synopsys' customers, this litigation should be stayed pending the outcome of the California Synopsys case

It has long been clear that "the power to stay proceedings is incidental to the power inherent in every court to control the disposition of the causes on its docket with economy of time and effort for itself, for counsel, and for litigants." *Landis v. North American Co.*, 229 U.S. 248, 254 (1936). The Third Circuit has noted that "as a general principle, duplicative litigation in the federal court system is to be avoided." *Remington Rand Corporation v. Business Systems, Inc.*, 830 F.2d 1274, 1276 (3d Cir. 1987). Where proceedings are pending in another district court on the same issues, there is no question that judicial economy would be served through use of a stay.

The purpose of the rule is to conserve judicial resources, avoid piecemeal litigation, eliminate the risk of inconsistent adjudications, and "to promote comity among federal courts of equal rank." *E.E.O.C. v. University of Pennsylvania*, 850 F.2d 969, 971-72 (3d Cir. 1988), *aff'd*, 493 U.S. 182 (1990). As long ago as sixty years ago, the Third Circuit warned against duplicative litigation and pointed out its pitfalls with language that rings true today:

The economic waste involved in duplicating litigation is obvious. Equally important is its adverse effect upon the prompt and efficient administration of justice. In view of the constant increase in judicial business in the federal courts and the continual necessity of adding to the number of

judges, at the expense of the taxpayers, public policy requires us to seek actively to avoid the waste of judicial time and energy. Courts already heavily burdened with litigation with which they must of necessity deal should therefore not be called upon to duplicate each other's work in cases involving the same issue and the same parties.

Crosley Corp. v. Hazeltine Corp., 122 F.2d 925, 929 (3d Cir. 1941), *cert. denied*, 315 U.S. 813, 86 L. Ed. 1211, 62 S. Ct. 798 (1942). Courts in the Third Circuit and the district courts within this Circuit have stayed cases under various circumstances to avoid the waste, delay, and potential inconsistent outcomes that would result from concurrent litigation. *See, e.g., E.E.O.C.*, 850 F.2d at 971-2; *Remington Rand Corporation*, 830 F.2d at 1276; *AT&T Corp. v. Public Serv. Enters. of Pa., Inc.*, C.A. No. 99-4975, 2000 U.S. Dist. LEXIS 4649, at *16 (E.D. Pa. Apr. 12, 2000) (Ex. I) (“Staying the instant action avoids a potentially gross waste of judicial resources” when pending appeal of related case may render action moot.); *Crawford v. West Jersey Health Sys.*, 847 F. Supp. 1232, 1243 (D.N.J. 1994) (staying entire litigation pending arbitration of certain counts to conserve judicial resources); *GPAC, Inc. v. D.W.W. Enters., Inc.*, 144 F.R.D. 60, 66 (D.N.J. 1992) (“[A] stay [pending reexamination of the patent-in-suit] would surely conserve the time and resources of the court as well as the parties.”).

When two suits are pending regarding the same patents, “[t]he general rule . . . is that ‘as a principle of sound judicial *Kahn* administration, the first suit should have priority, absent special circumstances.’” 889 F.2d at 1081 (Fed. Cir. 1989), quoting *William Gluckin & Co. v. International Playtex Corp.*, 407 F.2d 177, 178 (2d Cir. 1969). One of these “special circumstances” is the “customer suit” exception, “whereby litigation against or brought by the manufacturer of infringing goods takes precedence over a suit by the patent owner against customers of the manufacturer.” *Katz*, 909 F.2d at 1464. This preference for litigation involving the manufacturer of an accused product “is

based on the manufacturer's presumed greater interest in defending its actions against charges of patent infringement; and to guard against possibility of abuse." *Kahn*, 889 F.2d at 1081. For this reason, courts will stay a first-filed customer suit when a later-filed manufacturer suit will resolve the issues presented by the customer suit. *See Refac International, Ltd., v. IBM*, 790 F.2d 79, 81, *aff'd on reconsideration in relevant part by* 798 F.2d 459 (Fed. Cir. 1986) (affirming stay of suit against customers while suit proceeds against manufacturer); *Whelen Technologies, Inc. v. Mill Specialties, Inc.*, 741 F. Supp. 715 (N.D. Ill. 1990) (staying customer suit pending outcome of second-filed manufacturer suit); *ATSPI, Inc. v. Sharper Image, Inc.*, 677 F. Supp. 842 (W.D. Pa. 1988) (same).

It cannot be disputed that this litigation is a customer suit that should be stayed in favor of the California Synopsys case. Ricoh has informed at least one defendant that Ricoh's allegations of infringement here are based solely on the Defendants' use of Synopsys' Design Compiler. *See* Declaration of Alan MacPherson at ¶¶2-4. Synopsys has brought a case in the Northern District of California against Ricoh for a declaration of non-infringement of the '432 patent and of invalidity of that patent. *See* Ex. A. The California Court's determination regarding infringement and validity of the '432 patent will essentially dispose of the infringement issues regarding Synopsys' customers in this case. Either Synopsys will prevail and use of Design Compiler will be determined to be non-infringing or Ricoh will prevail and Synopsys will be forced to pay damages or take a license to the Ricoh patent, in which case Synopsys' customers will be immunized from liability under the doctrine of "patent exhaustion." *See Intel Corp. v. ULSI Corp.*, 995 F.2d 1566, 1568 (Fed. Cir. 1993) ("The law is well settled that an authorized sale of a

patented product places the product beyond the reach of the patent.”) (*citing Bloomer v. Millinger*, 68 U.S. (1 Wall.) 340, 350-51 (1864)).

B. Since “forum shopping” alone motivated Ricoh’s selection of Delaware, this litigation should be stayed pending the outcome of the California Synopsys case.

Another “special circumstance” constituting an exception to the first to file doctrine is “where forum shopping alone motivated the choice of sites for the suit” *Kahn*, 889 F.2d at 1081. Here, all of the circumstantial evidence indicates that forum shopping was a primary if not sole motivating factor for Ricoh’s selecting the District of Delaware and avoiding the Northern District of California. No acts of infringement are alleged to have taken place in Delaware and none of the parties maintains any facilities in Delaware. None of the party witnesses or party documents are found in Delaware. Ricoh is based in Tokyo, Japan and the East Coast is therefore less convenient than other possible jurisdictions on the West Coast, including the Northern District of California. Most importantly, despite the fact that Ricoh’s infringement allegations are based upon Defendants’ use of Synopsys’ Design Compiler, Ricoh picked a jurisdiction where none of the relevant Synopsys witnesses reside. As stated below, none of the other third party witnesses, whose testimony is necessary to prove Defendants’ noninfringement, invalidity and equitable estoppel defenses, are subject to the subpoena power of this Court.

Given these facts, it is appropriate for the Court to stay this action, filed against Synopsys’ customers, in favor of the action filed by Synopsys.

C. If not stayed, this litigation should be transferred to the Northern District of California pursuant to 28 U.S.C. § 1404.

If this litigation is not stayed it ought to be transferred to the Northern District of California where it can be consolidated or coordinated with Synopsys’ declaratory

judgment case. Title 28 of the U.S. Code, § 1404 (a) permits transfers of cases “[f]or the convenience of parties and witnesses [and] in the interests of justice.” The present dispute is integrally tied to events and persons in California. Present and former Synopsys engineers, the only persons familiar with the design of the software product that Ricoh accuses of infringement, live and work in the Bay Area. Synopsys’ equitable estoppel defense arises from historical events that took place in California. The Synopsys employees that attended the negotiations that give rise to the equitable estoppel defense are resident in the Northern District of California. Additionally, because the Electronic Design Automation industry of which Synopsys is a part is so tightly focused in the San Francisco Bay Area, the witnesses most familiar with the relevant prior art are also resident in the Northern District of California. The convenience to the parties and third party witnesses both suggest that the Northern District of California is a more suitable venue for resolution of the underlying patent dispute.

A case should be transferred transfer when the original matter could have been brought in the district to which the case is transferred, and where, after considering all relevant public and private factors, “the litigation would more conveniently proceed and the interests of justice be better served by transfer to a different forum.” *Jumara v. State Farm Insurance Co.*, 55 F.3d 873, 879 (3rd Cir. 1995). This Court has held that some of the private factors identified in *Jumara* significantly duplicate the provisions of Section 1404 (a) and, therefore, should not be given much weight to avoid the risk of double-counting. See *Affymetrix, Inc. v. Synteni, Inc.*, 28 F. Supp. 2d 192, 197 (D. Del. 1998). The remaining factors all weigh in favor of transfer to the Northern District.

1. Ricoh could have brought this litigation in the Northern District of California

In a patent case, venue is proper “where the defendant resides.” 28 U.S.C. § 1400(a). “For purposes of venue ... , a corporation shall be deemed to reside in any judicial district in which it is subject to personal jurisdiction...” 28 U.S.C. § 1391(c). Jurisdiction in the Northern District of California under California’s long-arm statute reaches to the extent allowed by the Due Process Clause, and is coextensive with the jurisdiction of the Delaware court in this action. *See Panavision Int’l, L.P. v. Toeppen*, 141 F.3d 1316, 1320 (9th Cir. 1998). Furthermore, all the Defendants have stated that, should this action proceed, litigation would be more convenient in the Northern District of California than in the District of Delaware. *See* Badlato Decl. at ¶4; Stoner Decl. at ¶4; Desbiens Decl. at ¶6. Ricoh could, therefore, have brought this case against the Defendants in the Northern District of California.

2. The balance of convenience factors strongly favors transfer to the Northern District of California.

This Court has formulated a “balance of convenience” test based upon the *Jumara* factors to determine whether transfer is appropriate. *See Affymetrix*, 28 F. Supp. 2d at 208-209. Among the factors considered are the connection between Delaware and the action; the physical locations of the parties and their financial position; the convenience and availability of witnesses; the location of records and other documents; and the relative congestion of the dockets in Delaware and the proposed transferee court. *Id.* at 197-208; *see also Allergan, Inc. v. Alcon Labs., Inc.*, C.A. No. 02-1682-GMS, 2003 U.S. Dist. LEXIS 2564, at *5 (D. Del. Feb. 25, 2003) (Ex. 4); *IKOS Systems*, 2002 U.S. Dist. LEXIS 20574 at *4-*6. To prevail, Defendants have the burden of showing that the

balance of these factors strongly favors transfer. *See Jumara*, 55 F.3d at 879; *Affymetrix*, 28 F. Supp. 2d at 200. Here, all the relevant factors favor transfer.

a) Delaware has a minimal interest in this case

No acts of infringement are alleged to have taken place in Delaware, and none of the parties maintain facilities in Delaware. *See Badlato Decl.* at ¶3; *Stoner Decl.* at ¶3; *Desbiens Decl.* at ¶4. In fact, the only relationship between this case and Delaware is that three of the Defendants are incorporated in Delaware, which only serves to give this Court personal jurisdiction over those Defendants. While not completely irrelevant, the Defendants' state of incorporation is "certainly not dispositive" for purposes of establishing the most convenient place to try this lawsuit. *See Mentor Graphics Corp. v. Quickturn Design Sys., Inc.*, 77 F. Supp. 2d 505, 509 n.6 (D. Del. 1999).

b) No party is physically present in Delaware, and the parties can litigate equally well in California

Neither Ricoh nor any defendant maintains its principal place of business nor, indeed, any facility, in Delaware. Aeroflex is located in Plainview, New York, on Long Island. *See Badlato Decl.* at ¶2. AMI is located in Idaho. *See Stoner Decl.* at ¶2. The Matrox defendants are located in Quebec, upstate New York, and Florida. *See Desbiens Decl.* at ¶¶2-4. Ricoh is located in Japan. It has no apparent facilities in Delaware, but does maintain six subsidiaries in California, including three within the Northern District of California, Ricoh Innovations, Inc. in Menlo Park, Ricoh Corporation Office Solutions and Systems Development Group in San Jose, Ricoh Silicon Valley, Inc. in Cupertino. *See Möller Decl.* at ¶5. Although no defendant is headquartered in California, all consider California to be a more convenient forum than Delaware. *See Badlato Decl.* at ¶4; *Stoner Decl.* at ¶4; *Desbiens Decl.* at ¶6. Finally, California is approximately 3,000

miles closer to Japan than Delaware, suggesting that it might be a more convenient forum were either of the inventors on the Ricoh patent to agree to appear in this litigation. *See Moller Decl.* at ¶9 (both inventors on the Ricoh patent appear to be located in Japan). A transfer to the Northern District would also reduce expenses since Defendants are represented by attorneys located in Northern California, and the “added expense of local Delaware counsel would be avoided if this case is transferred.”⁵ *See Mentor*, 77 F. Supp. 2d at 510 n.7. This factor weighs in favor of transfer.

c) Crucial third-party fact witnesses reside in California, beyond the subpoena power of this Court

This Court has noted that “[f]act witnesses who possess first-hand knowledge of the events giving rise to the lawsuit . . . have traditionally weighed quite heavily in the ‘balance of convenience’ analysis.” *Affymetrix*, 28 F. Supp. 2d at 203. The major fact questions in this case will require testimony from Synopsys personnel located in the Northern District. Defendants will need to obtain testimony from Synopsys personnel about the internal structure of Design Compiler in order to defend themselves against Ricoh’s patent infringement allegations. In support of its equitable estoppel defense, Defendants will also want to introduce testimony from present and/or former Synopsys employees regarding the 1991 meeting between KBS and Synopsys. *See McManus Decl.* at ¶8.

Furthermore, many of the key individuals who participated in the design of early logic synthesis systems and are therefore knowledgeable about the relevant prior art are located in the Bay Area. Some of the well-known prior art systems that are likely to be

⁵ Plaintiff is represented by attorneys located in Washington, DC, and would require local counsel in either venue.

relevant to this case include: the Cathedral system, the Socrates system, and the Yorktown Silicon Compiler. *See* Moller Decl. at ¶11. For example, a principal engineer involved with the design and development of the Cathedral system, Dr. Jan Rabaey, is currently on the faculty of the University of California at Berkeley. *See id.* In addition, David Gregory, a former Synopsys employee and currently CEO of ReShape, Inc. in Mountain View, California, was a principal architect of the Socrates system for the synthesis and optimization of logic circuit design. His Ph.D dissertation concerned aspects of the Socrates system. *See id.*; McManus Decl. at ¶¶9-10. Aart de Geus, now an executive with Synopsys, was also involved with the development of the Socrates synthesis system. Last, the principals involved in development of the Yorktown Silicon Compiler included Drs. Robert Brayton, Raul Camposano and Giovanni De Micheli. Dr. Brayton is on the faculty at the University of California at Berkeley, Dr. Camposano is an executive at Synopsys and Dr. De Micheli is on the faculty at Stanford University. *See* Moller Decl. at ¶11. All of these persons, with their extensive knowledge of prior art systems, are resident in the Northern District of California.

In addition, many of the individuals with the greatest familiarity with the Electronic Design Automation industry in general, and with logic synthesis in particular, are located in the Northern District. The significant players in the logic synthesis industry are Synopsys, Cadence Design Systems, Inc. ("Cadence"), Monterey Design Systems ("Monterey"), Magma Design Automation ("Magma"), Get2Chip, Inc. (recently acquired by Cadence) ("Get2Chip"), and Incentia Design Systems, Inc. ("Incentia"). Synopsys is headquartered, and has its principal engineering facilities, in Mountain View and Sunnyvale, California, Cadence and Get2Chip are located in San Jose, California, Monterey is located in Sunnyvale, Magma is located in Cupertino, California, and

Incentia has its principal place of business in Santa Clara, California. *See* McManus Decl. at ¶¶3, 12. All of these locations are within a few miles of each other in the Northern District of California.

The fact that all of the significant competitors in the logic synthesis arena and many, perhaps most, of the experts in this area are clustered in the Northern District reflects the accuracy of this Court's observation in the *IKOS Systems* decision that the Electronic Design Automation industry is, in effect, "resident" in the Northern District of California. *See IKOS Systems*, 2002 U.S. Dist. LEXIS 20574, at *5. The fact that Defendants' case is so heavily reliant on factual evidence that will have to be obtained from third parties in another judicial district is a strong factor weighing in favor of transfer.

Importantly, all of these witnesses vital to the Defendants' defense in this action are outside the subpoena power of this Court. The Defendants would therefore be greatly prejudiced if this action were to go forward in Delaware.

By contrast, no known witnesses for either party reside within Delaware. Because there are no critical witnesses located in this District, and there are critical witnesses located within the Northern District of California, this factor weighs strongly in favor of transfer. *See Affymetrix*, 28 F. Supp. 2d at 203-205; *Mentor*, 77 F. Supp. 2d at 510-512

**d) No relevant documents are present in Delaware,
while many are present in California**

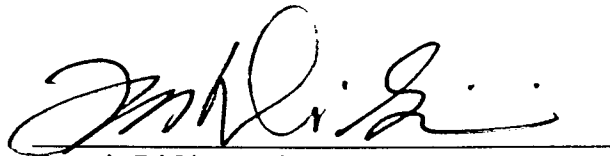
This Court has noted that the weight of this factor has decreased in recent years. *See Affymetrix*, 28 F. Supp. 2d at 205. Nevertheless, Defendants are aware of no documents relevant to this case in Delaware, whereas Synopsys presumably has many documents relevant to this case. This factor weighs in favor of transfer.

It is clear that this case would more conveniently proceed and the interests of justice would be better served by a transfer to the Northern District of California.

V. CONCLUSION

For the foregoing reasons, Defendants respectfully request that this Court stay the present litigation pending the outcome of the Synopsys case pending in the Northern District of California, or, alternatively, transfer this case to the Northern District of California for consolidation with the Synopsys case.

Dated: June 12, 2003



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270783v1

CERTIFICATE OF SERVICE

I, Francis DiGiovanni, hereby certify that on the 12th day of June, 2003, a true and correct copy of the foregoing was caused to be served on the attorneys of record at the following addresses:

VIA HAND DELIVERY

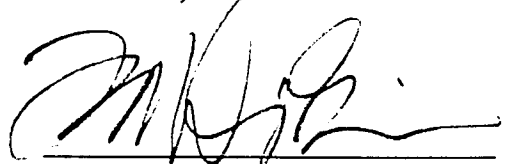
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United States Patent [19]**Kobayashi et al.**[11] **Patent Number:** **4,922,432**[45] **Date of Patent:** **May 1, 1990**

- [54] **KNOWLEDGE BASED METHOD AND APPARATUS FOR DESIGNING INTEGRATED CIRCUITS USING FUNCTIONAL SPECIFICATIONS**
- [75] **Inventors:** Hideaki Kobayashi, Columbia, S.C.; Masahiro Shindo, Osaka, Japan
- [73] **Assignees:** International Chip Corporation, Columbia, S.C.; Ricoh Company, Ltd., Tokyo, Japan
- [21] **Appl. No.:** 143,821
- [22] **Filed:** Jan. 13, 1988
- [51] **Int. Cl.⁵** G06F 15/60
- [52] **U.S. Cl.** 364/490; 364/489; 364/488; 364/521
- [58] **Field of Search** 364/488-491, 364/521, 300, 513

[56] **References Cited****U.S. PATENT DOCUMENTS**

4,635,208	1/1987	Coleby et al.	364/491
4,638,442	1/1987	Bryant et al.	364/489
4,648,044	3/1987	Hardy et al.	364/513
4,651,284	3/1987	Watanabe et al.	364/491
4,656,603	4/1987	Duan	364/488
4,658,370	4/1987	Erman et al.	364/513
4,675,829	6/1987	Clemenson	364/513
4,700,317	10/1987	Watanabe et al.	364/521
4,703,435	10/1987	Darringer et al.	364/488
4,803,636	2/1989	Nishiyama et al.	364/491

FOREIGN PATENT DOCUMENTS

1445914	8/1976	United Kingdom	364/490
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OTHER PUBLICATIONS

- "Verifying Compiled Silicon", by E. K. Cheng, VLSI Design, Oct. 1984, pp. 1-4.
- "CAD System for IC Design", by M. E. Daniel et al., IEEE Trans. on Computer-Aided Design of Integrated Circuits & Systems, vol. CAD-1, No. 1, Jan. 1982, pp. 2-12.
- "An Overview of Logic Synthesis System", by L. Trevillyan, 24th ACM/IEEE Design Automation Conference, 1978, pp. 166-172.
- "Methods Used in an Automatic Logic Design Generator", by T. D. Friedman et al., IEEE Trans. on Computers, vol. C-18, No. 7, Jul. 1969, pp. 593-613.

"Experiments in Logic Synthesis", by J. A. Darringer, IEEE ICC, 1980.

"A Front End Graphic Interface to First Silicon Compiler", by J. H. Nash, EDA 84, Mar. 1984.

"Quality of Designs from An Automatic Logic Generator", by T. D. Friedman et al., IEEE 7th DA Conference, 1970, pp. 71-89.

"A New Look at Logic Synthesis", by J. A. Darringer et al., IEEE 17th D. A. Conference 1980, pp. 543-548.

Trevillyan—Trickey, H., Flamel: *A High Level Hardware Compiler*, IEEE Transactions On Computer Aided Design, Mar. 1987, pp. 259-269.

Parker et al., *The CMU Design Automation System—An Example of Automated Data Path Design*, Proceedings Of The 16th Design Automation Conference, Las Vegas, Nev., 1979, pp. 73-80.

An Engineering Approach to Digital Design, William I. Fletcher, Prentice-Hall, Inc., pp. 491-505.

Primary Examiner—Felix D. Gruber

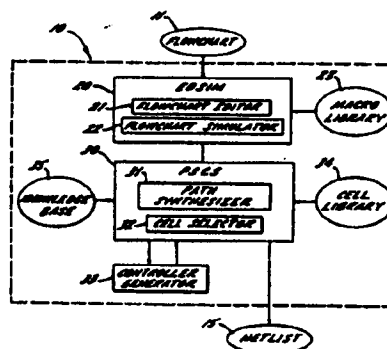
Assistant Examiner—V. N. Trans

Attorney, Agent, or Firm—Bell, Seltzer, Park & Gibson

[57] **ABSTRACT**

The present invention provides a computer-aided design system and method for designing an application specific integrated circuit which enables a user to define functional architecture independent specifications for the integrated circuit and which translates the functional architecture independent specifications into the detailed information needed for directly producing the integrated circuit. The functional architecture independent specifications of the desired integrated circuit can be defined at the functional architecture independent level in a flowchart format. From the flowchart, the system and method uses artificial intelligence and expert systems technology to generate a system controller, to select the necessary integrated circuit hardware cells needed to achieve the functional specifications, and to generate data and control paths for operation of the integrated circuit. This list of hardware cells and their interconnection requirements is set forth in a netlist. From the netlist it is possible using known manual techniques or existing VLSI CAD layout systems to generate the detailed chip level topological information (mask data) required to produce the particular application specific integrated circuit.

20 Claims, 12 Drawing Sheets



U.S. Patent

May 1, 1990

Sheet 1 of 12

4,922,432

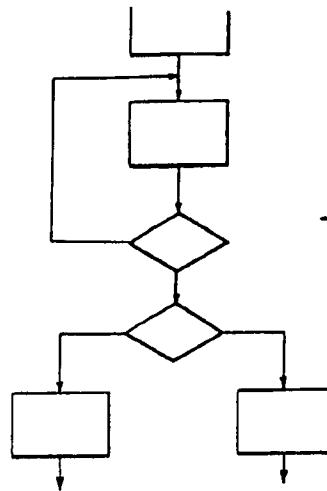


Fig. 1a.
FUNCTIONAL LEVEL

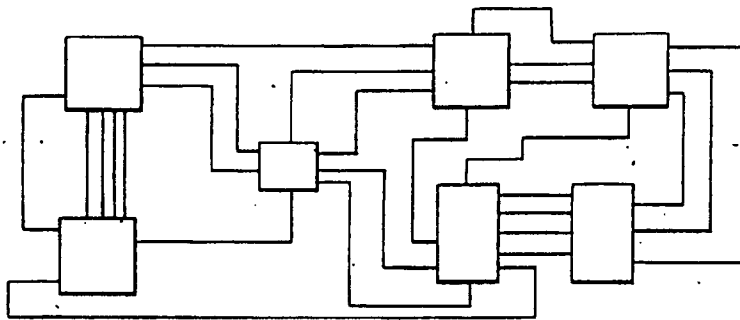


Fig. 1b.
STRUCTURAL LEVEL

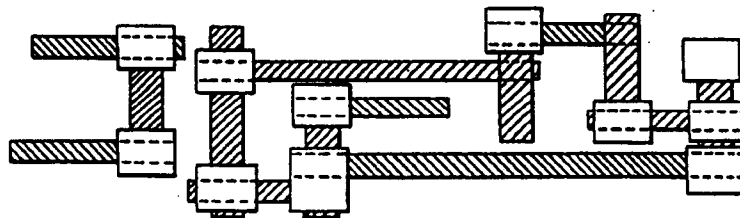


Fig. 1c.
PHYSICAL LAYOUT LEVEL

U.S. Patent

May 1, 1990

Sheet 2 of 12

4,922,432

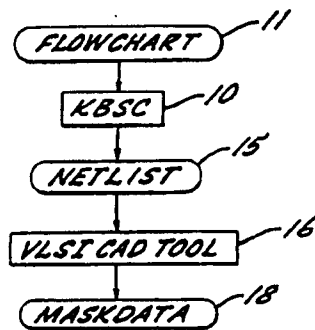


FIG. 2.

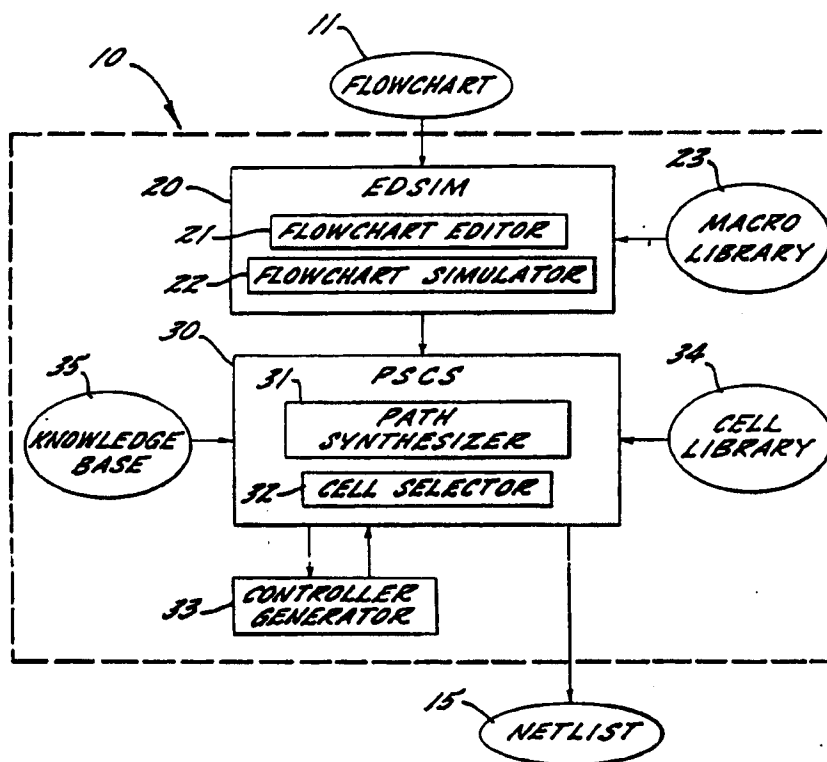


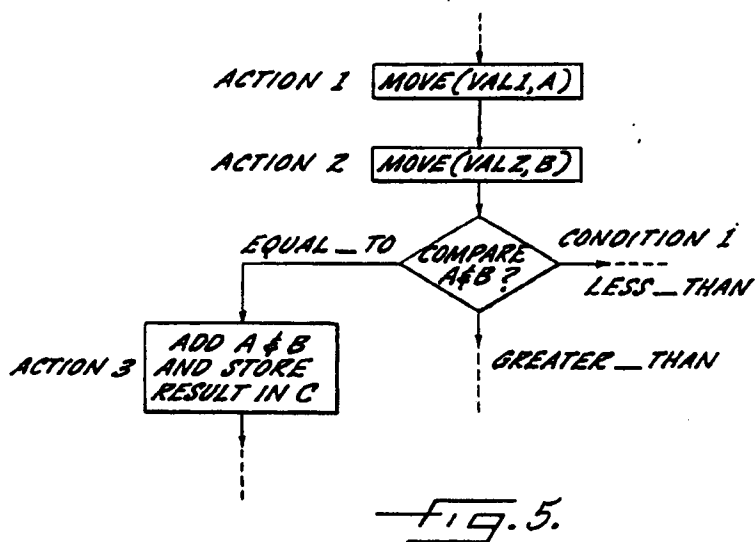
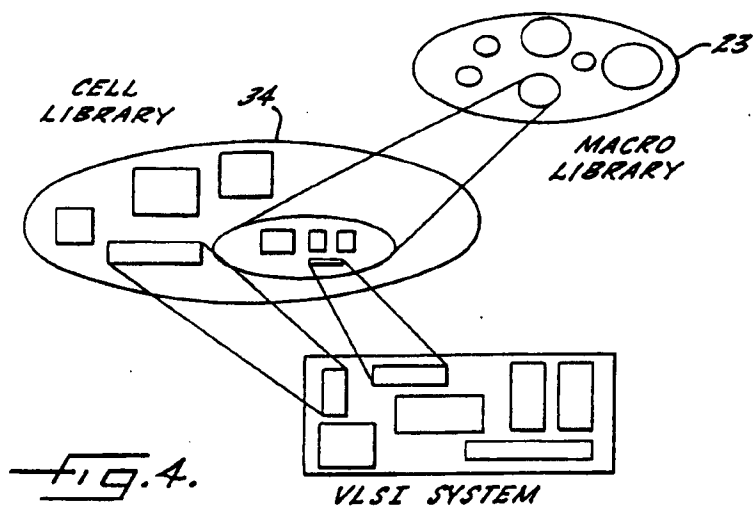
FIG. 3.

U.S. Patent

May 1, 1990

Sheet 3 of 12

4,922,432



U.S. Patent

May 1, 1990

Sheet 4 of 12

4,922,432

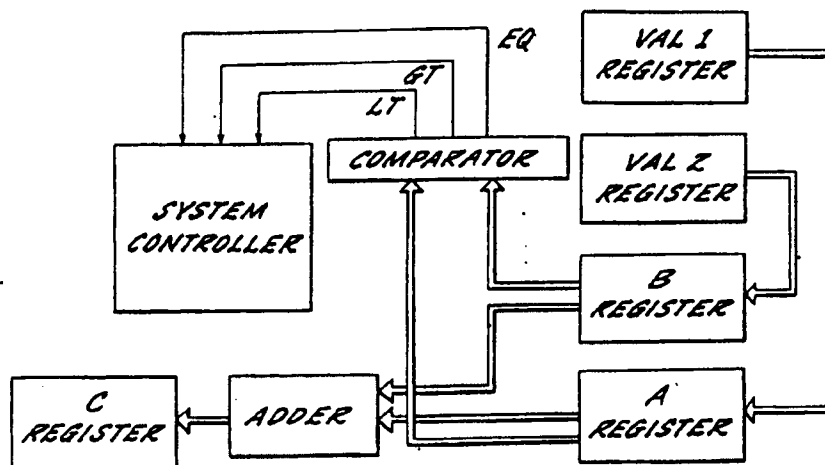


FIG. 6.

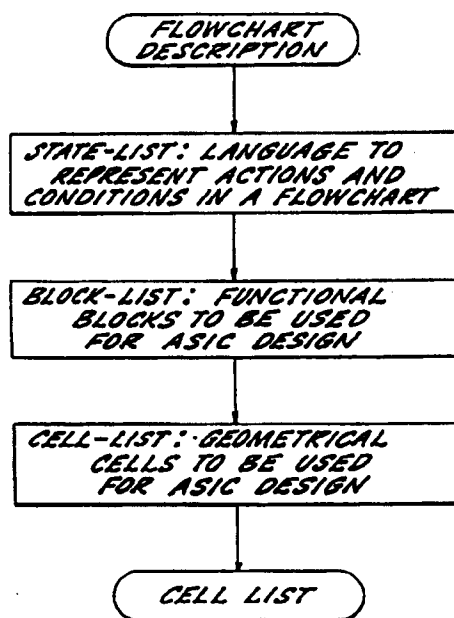


FIG. 9.

U.S. Patent

May 1, 1990

Sheet 5 of 12

4,922,432

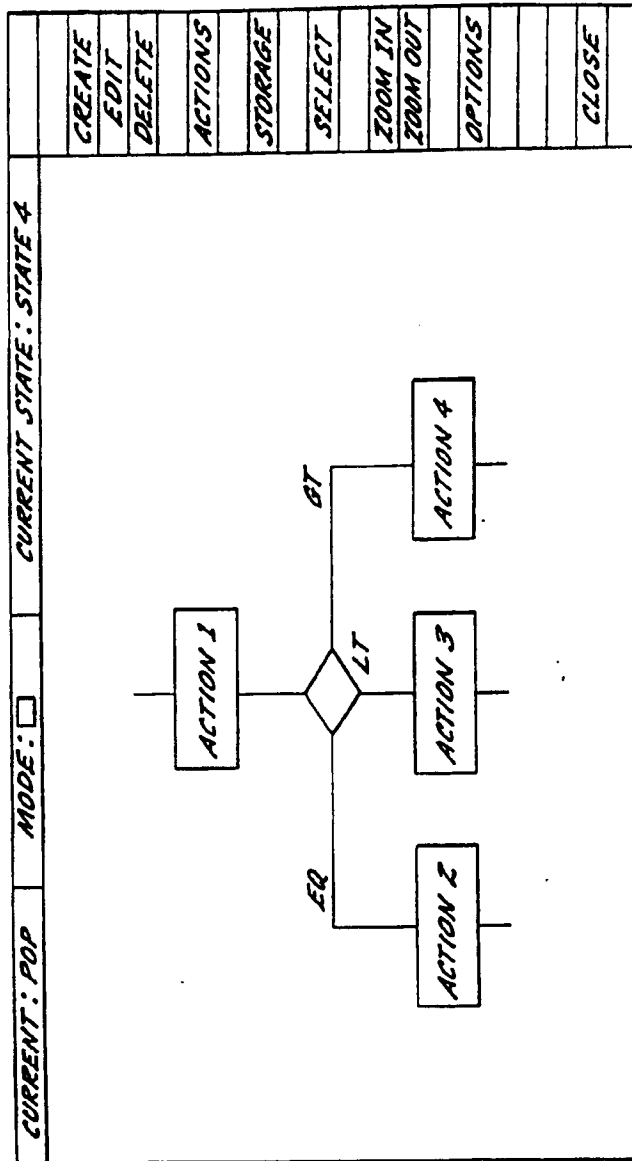


FIG. 7.

U.S. Patent**May 1, 1990****Sheet 6 of 12****4,922,432**

EDIT DATA	SET BREAKS	STEP	HISTORY ON	CANCEL
SHOW DATA	CLEAR BREAKS	EXECUTE	DETAIL	HELP
SET STATE	SHOW BREAKS	STOP		CLOSE

*** READY ***

FIG. 8.

U.S. Patent

May 1, 1990

Sheet 7 of 12

4,922,432

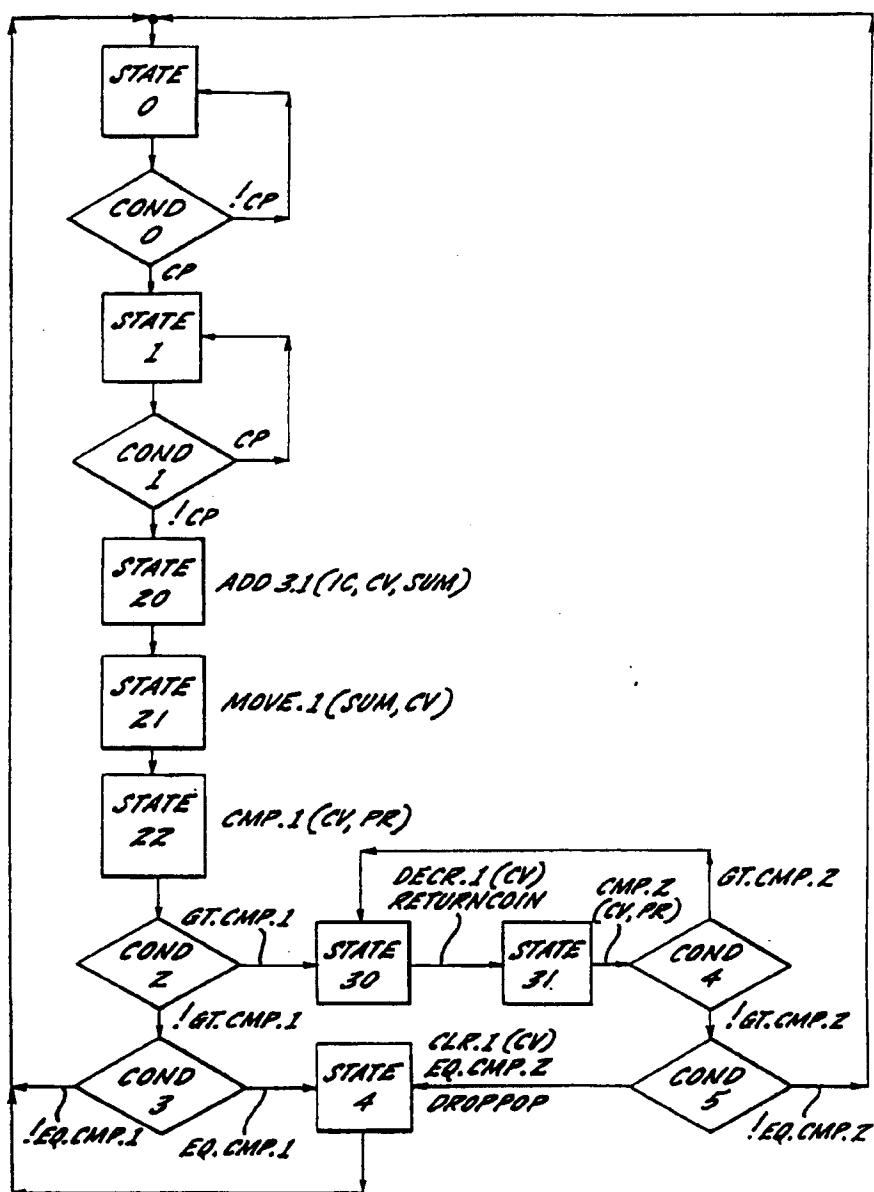


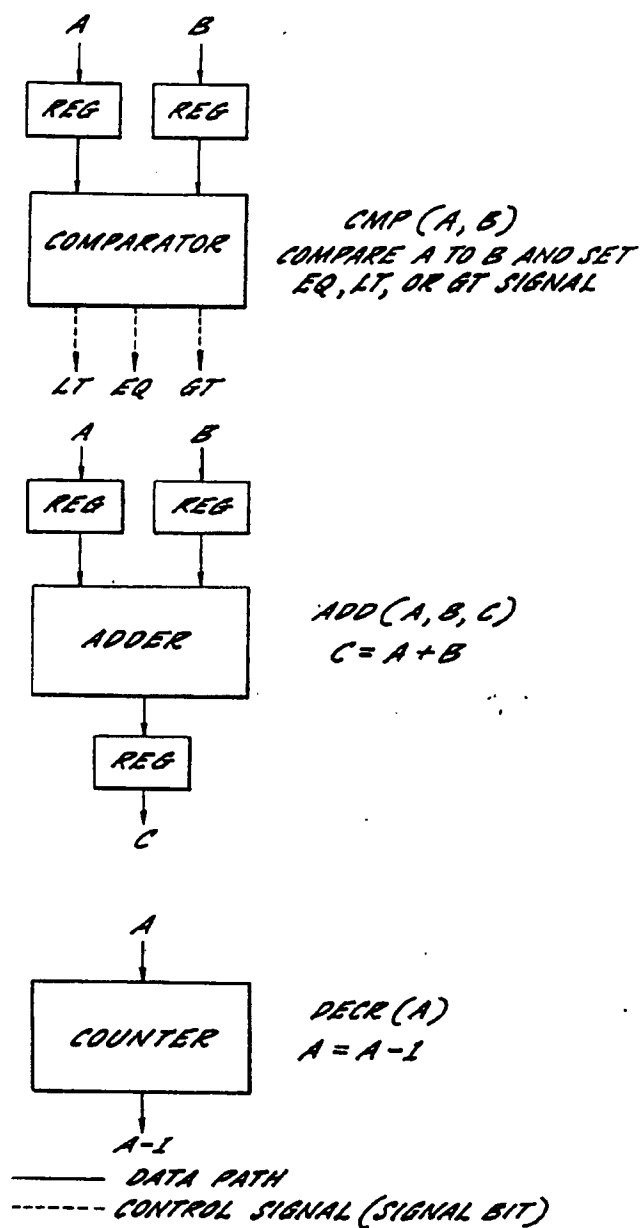
FIG. 10.

U.S. Patent

May 1, 1990

Sheet 8 of 12

4,922,432

FIG. 11.

U.S. Patent

May 1, 1990

Sheet 9 of 12

4,922,432

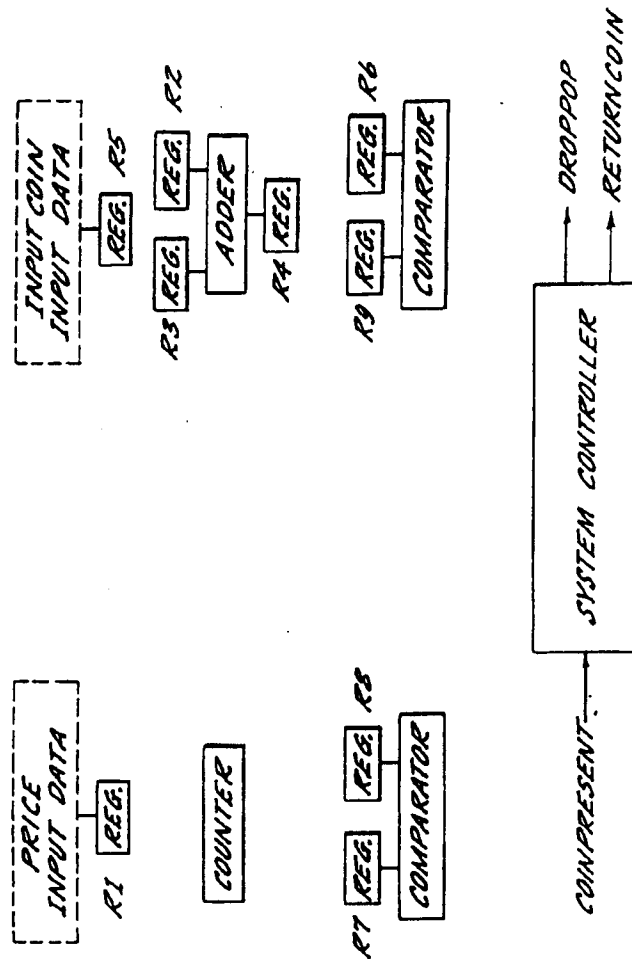


FIG. 12.

U.S. Patent

May 1, 1990

Sheet 10 of 12

4,922,432

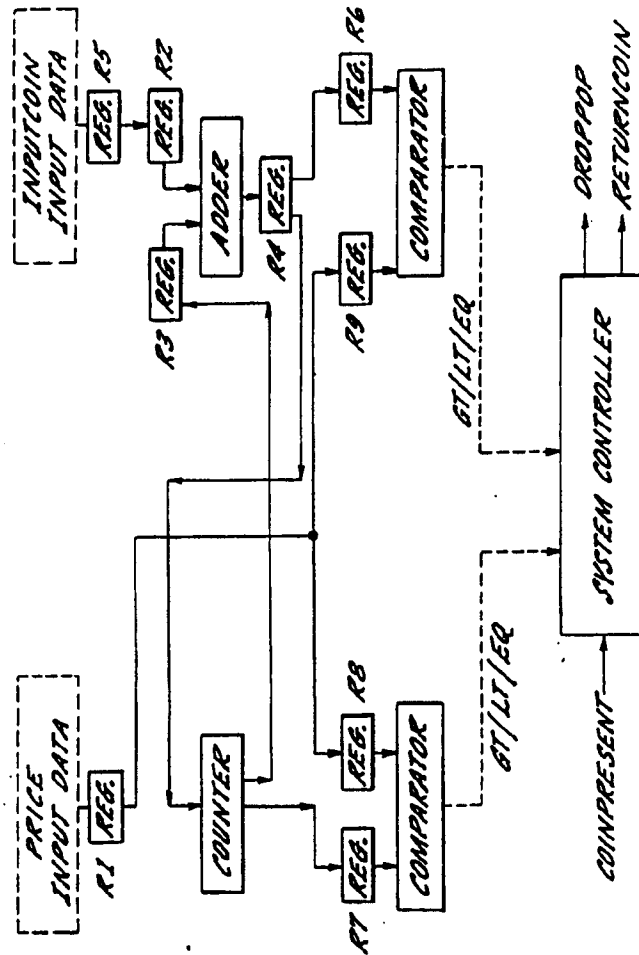


FIG. 13.

U.S. Patent

May 1, 1990

Sheet 11 of 12

4,922,432

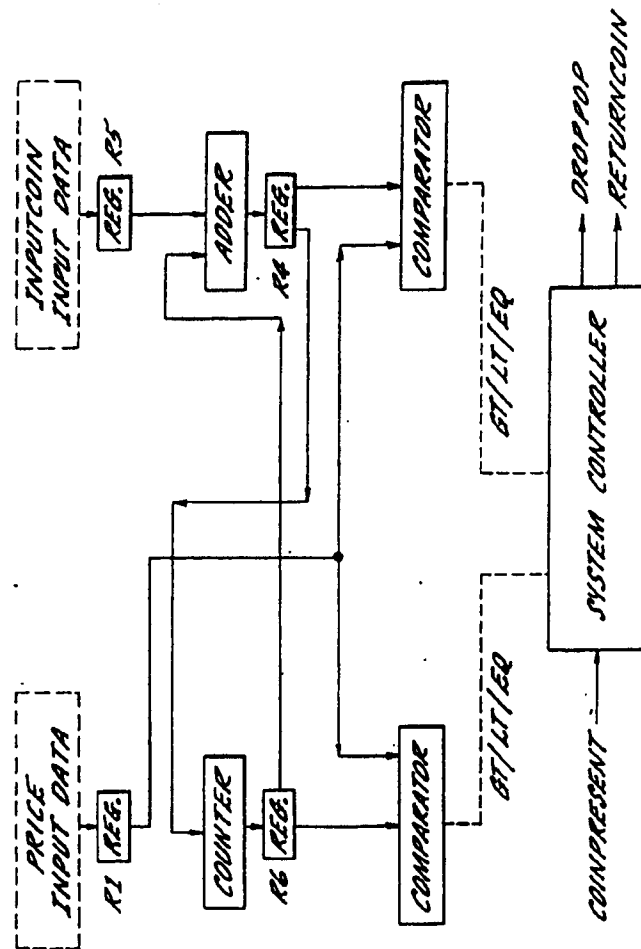


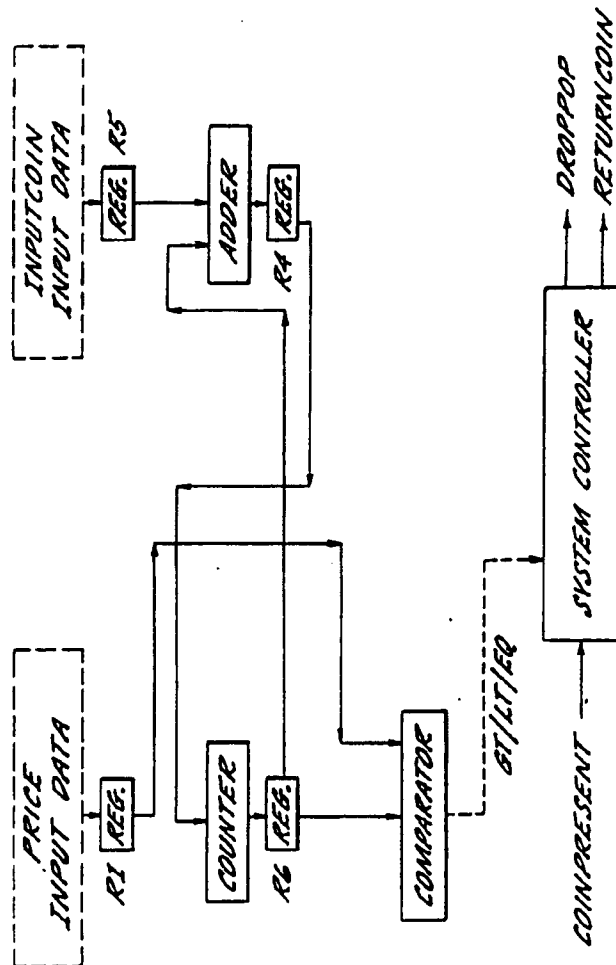
FIG. 14.

U.S. Patent

May 1, 1990

Sheet 12 of 12

4,922,432

FIG. 15.

1

KNOWLEDGE BASED METHOD AND APPARATUS FOR DESIGNING INTEGRATED CIRCUITS USING FUNCTIONAL SPECIFICATIONS

FIELD AND BACKGROUND OF THE INVENTION

This invention relates to the design of integrated circuits, and more particularly relates to a computer-aided method and apparatus for designing integrated circuits.

An application specific integrated circuit (ASIC) is an integrated circuit chip designed to perform a specific function, as distinguished from standard, general purpose integrated circuit chips, such as microprocessors, memory chips, etc. A highly skilled design engineer having specialized knowledge in VLSI circuit design is ordinarily required to design a ASIC. In the design process, the VLSI design engineer will consider the particular objectives to be accomplished and tasks to be performed by the integrated circuit and will create structural level design specifications which define the various hardware components required to perform the desired function, as well as the interconnection requirements between these components. A system controller must also be designed for synchronizing the operations of these components. This requires an extensive and all encompassing knowledge of the various hardware components required to achieve the desired objectives, as well as their interconnection requirements, signal level compatibility, timing compatibility, physical layout, etc. At each design step, the designer must do tedious analysis. The design specifications created by the VLSI design engineer may, for example, be in the form of circuit schematics, parameters or specialized hardware description languages (HDLs).

From the structural level design specifications, the description of the hardware components and interconnections is converted to a physical chip layout level description which describes the actual topological characteristics of the integrated circuit chip. This physical chip layout level description provides the mask data needed for fabricating the chip.

Due to the tremendous advances in very large scale integration (VLSI) technology, highly complex circuit systems are being built on a single chip. With their complexity and the demand to design custom chips at a faster rate, in large quantities, and for an ever increasing number of specific applications, computer-aided design (CAD) techniques need to be used. CAD techniques have been used with success in design and verification of integrated circuits, at both the structural level and at the physical layout level. For example, CAD systems have been developed for assisting in converting VLSI structural level descriptions of integrated circuits into the physical layout level topological mask data required for actually producing the chip. Although the presently available computer-aided design systems greatly facilitate the design process, the current practice still requires highly skilled VLSI design engineers to create the necessary structural level hardware descriptions.

There is only a small number of VLSI designers who possess the highly specialized skills needed to create structural level integrated circuit hardware descriptions. Even with the assistance of available VLSI CAD tools, the design process is time consuming and the probability of error is also high because of human in-

4,922,432

2

volvements. There is a very significant need for a better and more cost effective way to design custom integrated circuits.

SUMMARY OF THE INVENTION

In accordance with the present invention a CAD (computer-aided design) system and method is provided which enables a user to define the functional requirements for a desired target integrated circuit, using an easily understood functional architecture independent level representation, and which generates therefrom the detailed information needed for directly producing an application specific integrated circuit (ASIC) to carry out those specific functions. Thus, the present invention, for the first time, opens the possibility for the design and production of ASICs by designers, engineers and technicians who may not possess the specialized expert knowledge of a highly skilled VLSI design engineer.

The functional architecture independent specifications of the desired ASIC can be defined in a suitable manner, such as in list form or preferably in a flowchart format. The flowchart is a highly effective means of describing a sequence of logical operations, and is well understood by software and hardware designers of varying levels of expertise and training. From the flowchart (or other functional specifications), the system and method of the present invention translates the functional architecture independent specifications into structural an architecture specific level definition of an integrated circuit, which can be used directly to produce the ASIC. The structural level definition includes a list of the integrated circuit hardware cells needed to achieve the functional specifications. These cells are selected from a cell library of previously designed hardware cells of various functions and technical specifications. The system also generates data paths among the selected hardware cells. In addition, the present invention generates a system controller and control paths for the selected integrated circuit hardware cells. The list of hardware cells and their interconnection requirements may be represented in the form of a netlist. From the netlist it is possible using either known manual techniques or existing VLSI CAD layout systems to generate the detailed chip level geometrical information (e.g. mask data) required to produce the particular application specific integrated circuit in chip form.

The preferred embodiment of the system and method of the present invention which is described more fully hereinafter is referred to as a Knowledge Based Silicon Compiler (KBSC). The KBSC is an ASIC design methodology based upon artificial intelligence and expert systems technology. The user interface of KBSC is a flowchart editor which allows the designer to represent VLSI systems in the form of a flowchart. The KBSC utilizes a knowledge based expert system, with a knowledge base extracted from expert ASIC designers with a high level of expertise in VLSI design to generate from the flowchart a netlist which describes the selected hardware cells and their interconnection requirements.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood by reference to the detailed description which follows, taken in connection with the accompanying drawings, in which

4,922,432

3

FIG. 1a illustrates a functional level design representation of a portion of a desired target circuit, shown in the form of a flowchart;

FIG. 1b illustrates a structural level design representation of an integrated circuit;

FIG. 1c illustrates a design representation of a circuit at a physical layout level, such as would be utilized in the fabrication of an integrated circuit chip;

FIG. 2 is a block schematic diagram showing how integrated circuit mask data is created from flowchart descriptions by the KBSC system of the present invention;

FIG. 3 is a somewhat more detailed schematic illustration showing the primary components of the KBSC system;

FIG. 4 is a schematic illustration showing how the ASIC design system of the present invention draws upon selected predefined integrated circuit hardware cells from a cell library;

FIG. 5 is an example flowchart defining a sequence of functional operations to be performed by an integrated circuit;

FIG. 6 is a structural representation showing the hardware blocks and interconnection requirements for the integrated circuit defined in FIG. 5;

FIG. 7 is an illustration of the flowchart editor window;

FIG. 8 is an illustration of the flowchart simulator window;

FIG. 9 is an illustration of the steps involved in cell list generation;

FIG. 10 is an example flowchart for a vending machine system;

FIG. 11 illustrates the hardware components which correspond to each of the three macros used in the flowchart of FIG. 10;

FIG. 12 is an initial block diagram showing the hardware components for an integrated circuit as defined in the flowchart of FIG. 10;

FIG. 13 is a block diagram corresponding to FIG. 12 showing the interconnections between blocks;

FIG. 14 is a block diagram corresponding to FIG. 13 after register optimization; and

FIG. 15 is a block diagram corresponding to FIG. 14 after further optimization.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

FIGS. 1a, 1b and 1c illustrate three different levels of representing the design of an integrated circuit. FIG. 1a shows a functional (or behavioral) representation architecture independent in the form of a flowchart. A flowchart is a graphic representation of an algorithm and consists of two kinds of blocks or states, namely actions and conditions (decisions). Actions are conventionally represented in the flowchart by a rectangle or box, and conditions are represented by a diamond. Transitions between actions and conditions are represented by lines with arrows. FIG. 1b illustrates a structural (or logic) level representation of an integrated circuit. In this representation, blocks are used to represent integrated architecture specific circuit hardware components for performing various functions, and the lines interconnecting the blocks represent paths for the flow of data or control signals between the blocks. The blocks may, for example, represent hardware components such as adders, comparators, registers, system controllers, etc. FIG. 1c illustrates a physical layout level representation

4

of an integrated circuit design, which provides the detailed mask data necessary to actually manufacture the devices and conductors which together comprise integrated circuit.

As noted earlier, the design of an integrated circuit at the structural level requires a design engineer with highly specialized skills and expertise in VLSI design. In the KBSC system of the present invention, however, integrated circuits can be designed at a functional level because the expertise in VLSI design is provided and applied by the invention. Allowing the designer to work with flowcharts instead of logic circuit schematics simplifies the task of designing custom integrated circuits, making it quicker, less expensive and more reliable. The designer deals with an algorithm using simple flowcharts at an architecture independent functional (behavioral) level, and needs to know only the necessary logical steps to complete a task, rather than the specific means for accomplishing the task. Designing with flowcharts requires less work in testing because flowcharts allow the designer to work much closer to the algorithm. On the other hand, previously existing VLSI design tools require the designer to represent an algorithm with complex circuit schematics at a structural level, therefore requiring more work in testing. Circuit schematics make it harder for the designer to cope with the algorithm function which needs to be incorporated into the target design because they intermix the hardware and functional considerations. Using flowcharts to design custom integrated circuits will allow a large number of system designers to access VLSI technology, where previously only a small number of designers had the knowledge and skills to create the necessary structural level hardware descriptions.

The overall system flow is illustrated in FIG. 2. The user enters the functional specifications of the circuit into the knowledge based silicon compiler (KBSC) 10 in the form of a flowchart 11. The KBSC 10 then generates a netlist 15 from the flowchart. The netlist 15 includes a custom generated system controller, all other hardware cells required to implement the necessary operations, and interconnection information for connecting the hardware cells and the system controller. The netlist can be used as input to any existing VLSI layout and routing tool 16 to create mask data 18 for geometrical layout.

System Overview

The primary elements or modules which comprise the KBSC system are shown in FIG. 3. In the embodiment illustrated and described herein, these elements or modules are in the form of software programs, although persons skilled in the appropriate art will recognize that these elements can easily be embodied in other forms, such as in hardware.

Referring more particularly to FIG. 3, it will be seen that the KBSC system 10 includes a program 20 called EDSIM, which comprises a flowchart editor 21 for creating and editing flowcharts and a flowchart simulator 22 for simulation and verification of flowcharts. Actions to be performed by each of the rectangles represented in the flowchart are selected from a macro library 23. A program 30 called PSCS (path synthesizer and cell selector) includes a data and control path synthesizer module 31, which is a knowledge based system for data and control path synthesis. PSCS also includes a cell selector 32 for selecting the cells required for system design. The cell selector 32 selects from a cell

5

4,922,432

library 34 of previously designed hardware cells the appropriate cell or cells required to perform each action and condition represented in the flowchart. A controller generator 33 generates a custom designed system controller for controlling the operations of the other hardware cells. The knowledge base 35 contains ASIC design expert knowledge required for data path synthesis and cell selection. Thus, with a functional flowchart input, PSCS generates a system controller, selects all other hardware cells, generates data and control paths, and generates a netlist describing all of this design information.

The KBSC system employs a hierarchical cell selection ASIC design approach, as is illustrated in FIG. 4. Rather than generating every required hardware cell from scratch, the system draws upon a cell library 34 of previously designed, tested and proven hardware cells of various types and of various functional capabilities with a given type. The macro library 23 contains a set of macros defining various actions which can be specified in the flowchart. For each macro function in the macro library 23 there may be several hardware cells in the cell library 34 of differing geometry and characteristics capable of performing the specified function. Using a rule based expert system with a knowledge base 35 extracted from expert ASIC designers, the KBSC system selects from the cell library 34 the optimum cell for carrying out the desired function.

Referring again to FIG. 3, the cells selected by the cell selector 32, the controller information generated by the controller generator 33 and the data and control paths generated by the data/control path synthesizer 31 are all utilized by the PSCS program 30 to generate the netlist 15. The netlist is a list which identifies each block in the circuit and the interconnections between the respective inputs and outputs of each block. The netlist provides all the necessary information required to produce the integrated circuit. Computer-aided design systems for cell placement and routing are commercially available which will receive netlist data as input and will lay out the respective cells in the chip, generate the necessary routing, and produce mask data which can be directly used by a chip foundry in the fabrication of integrated circuits.

System Requirements

The KBSC system can be operated on a suitable programmed general purpose digital computer. By way of example, one embodiment of the system is operated in a work station environment such as Sun3 and VAXStation-II/GPX Running UNIX Operating System and X Window Manager. The work station requires a minimum of 8 megabytes of main storage and 20 megabytes of hard disk space. The monitor used is a color screen with 8-bit planes. The software uses C programming language and INGRES relational data base.

The human interface is mainly done by the use of pop up menus, buttons, and a special purpose command language. The permanent data of the integrated circuit design are stored in the data base for easy retrieval and update. Main memory stores the next data temporarily, executable code, design data (flowchart, logic, etc.), data base (cell library), and knowledge base. The CPU performs the main tasks of creating and simulating flowcharts and the automatic synthesis of the design.

6

Flowchart Example

To describe the mapping of a flowchart to a netlist, consider an example flowchart shown in FIG. 5, which is of part of a larger overall system. In this illustrative flowchart, two variables, VAL1 and VAL2 are compared and if they are equal, they are added together. In this instance, the first action (Action 1) involves moving the value of variable VAL1 to register A. The second action comprises moving the value of variable VAL2 to register B. Condition 1 comprises comparing the values in registers A and B. Action 3 comprises adding the values of registers A and B and storing the result in register C.

In producing an integrated circuit to carry out the function defined in FIG. 5, the KBSC maps the flowchart description of the behavior of the system to interconnection requirements between hardware cells. The hardware cells are controlled by a system controller which generates all control signals. There are two types of variables involved in a system controller:

(1) Input variables: These are generated by hardware cells, and/or are external input to the controller. These correspond to conditions in the flowchart.

(2) Output variables: These are generated by the system controller and correspond to actions in the flowchart.

FIG. 6 illustrates the results of mapping the flowchart of FIG. 5 onto hardware cells. The actions and the conditions in the flowchart are used for cell selection and data and control path synthesis. The VAL1 register and VAL2 register and the data paths leading therefrom have already been allocated in actions occurring before Action 1 in our example. Action 1 causes generation of the data register A. Similarly, Action 2 causes the allocation of data register B. The comparator is allocated as a result of the comparison operation in Condition 1. The comparison operation is accomplished by (1) selecting a comparator cell, (2) mapping the inputs of the comparator cell to registers A and B, (3) generating data paths to connect the comparator with the registers A and B and (4) generating input variables corresponding to equal to, greater than, and less than for the system controller. Similarly the add operation in Action 3 causes selection of the adder cell, mapping of the adder parameters to the registers and creating the data paths.

Following this methodology, a block list can be generated for a given flowchart. This block list consists of a system controller and as many other blocks as may be required for performing the necessary operations. The blocks are connected with data paths, and the blocks are controlled by the system controller through control paths. These blocks can be mapped to the cells selected from a cell library to produce a cell list.

Interactive Flowchart Editor and Simulator

The creation and verification of the flowchart is the first step in the VLSI design methodology. The translation from an algorithm to an equivalent flowchart is performed with the Flowchart Editor 21 (FIG. 3). The verification of the edited flowchart is performed by the Flowchart Simulator 22. The Flowchart Editor and Simulator are integrated into one working environment for interactive flowchart editing, with a designer friendly interface.

EDSIM is the program which contains the Flowchart Editor 21 and the Flowchart Simulator 22. It also provides functions such as loading and saving flow-

7

charts. EDSIM will generate an intermediate file, called a statelist, for each flowchart. This file is then used by the PSCS program 30 to generate a netlist.

Flowchart Editor

The Flowchart Editor 21 is a software module used for displaying, creating, and editing the flowchart. This module is controlled through the flowchart editing window illustrated in FIG. 7. Along with editing functions the Flowchart Editor also provides checking of design errors.

The following is a description of the operations of the Flowchart Editor. The main editing functions include, create, edit, and delete states, conditions, and transitions. The create operation allows the designer to add a new state, condition, or transitions to a flowchart. Edit allows the designer to change the position of a state, condition or transition, and delete allows the designer to remove a state, condition or transition from the current flowchart. States which contain actions are represented by boxes, conditions are represented by diamonds, and transitions are represented by lines with arrows showing the direction of the transition.

Edit actions allows the designer to assign actions to each box. These actions are made up of macro names and arguments. An example of arguments is the setting and clearing of external signals. A list of basic macros available in the macro library 23 is shown in Table 1.

TABLE 1

Macro	Description
ADD (A,B,C)	C = A + B
SUB (A,B,C)	C = A - B
MULT (A,B,C)	C = A * B
DIV (A,B,C)	C = A div B
DECR (A)	A = A - 1
INCR (A)	A = A + 1
CLR (A)	A = 0
REG (A,B)	B = A
CMP (A,B)	Compare A to B and set EQ,LT,GT signals
CMPO (A)	Compare A to 0 and set EQ,LT,GT signals
NEGATE (A)	A = NOT (A)
MOD (A,B,C)	C = A Modulus B
POW (A,B,C)	C = A ^B
DCI (A,S1,S2,S3,S4)	Decode A into S1,S2,S3,S4
ECI (S1,S2,S3,S4,A)	Encode S1,S2,S3,S4 into A
MOVE (A,B)	B = A
CALL sub-flowchart (A,B,...)	Call a sub-flowchart. Pass A,B...
START (A,B,...)	Beginning state of a sub-flowchart
STOP (A,B,...)	Ending state of a sub-flowchart

The Flowchart Editor also provides a graphical display of the flowchart as the Flowchart Simulator simulates the flowchart. This graphical display consists of boxes, diamonds, and lines as shown in FIG. 7. All are drawn on the screen and look like a traditional flowchart. By displaying the flowchart on the screen during simulation it allows the designer to design and verify the flowchart at the same time.

Flowchart Simulator

The Flowchart Simulator 22 is a software module used for simulating flowcharts. This module is controlled through the simulator window illustrated in FIG. 8. The Flowchart Simulator simulates the transitions between states and conditions in a flowchart. The following is a list of the operations of the Flowchart Simulator:

edit data—Change the value of a register or memory.

8

set state—Set the next state to be simulated.

set detail or summary display—Display summary or detail information during simulation.

set breaks—Set a breakpoint.

clear breaks—Clear all breakpoints.

show breaks—Display current breakpoints.

step—Step through one transition.

execute—Execute the flowchart.

stop—Stop executing of the flowchart. history ON or history OFF—Set history recording on or off.

cancel—Cancel current operation.

help—Display help screen.

close—Close the simulator window.

The results of the simulation are displayed within the simulator window. Also the editor window will track the flowchart as it is being simulated. This tracking of the flowchart makes it easy to edit the flowchart when an error is found.

Cell Selection

The Cell Selector 32 is a knowledge based system for selecting a set of optimum cells from the cell library 34 to implement a VLSI system. The selection is based on functional descriptions in the flowchart, as specified by the macros assigned to each action represented in the flowchart. The cells selected for implementing a VLSI system depend on factors such as cell function, fabrication technology used, power limitations, time delays etc. The cell selector uses a knowledge base extracted from VLSI design experts to make the cell selection.

To design a VLSI system from a flowchart description of a user application, it is necessary to match the functions in a flowchart with cells from a cell library. This mapping needs the use of artificial intelligence techniques because the cell selection process is complicated and is done on the basis of a number of design parameters and constraints. The concept used for cell selection is analogous to that used in software compilation. In software compilation a number of subroutines are linked from libraries. In the design of VLSI systems, a functional macro can be mapped to library cell.

FIG. 4 illustrates the concept of hierarchical cell selection. The cell selection process is performed in two steps:

- (1) selection of functional macros
- (2) selection of geometrical cells

A set of basic macros is shown in Table 1. A macro corresponds to an action in the flowchart. As an example, consider the operation of adding A and B and storing the result in C. This function is mapped to the addition macro ADD(X, Y, Z). The flowchart editor and flowchart simulator are used to draw the rectangles, diamonds and lines of the flowchart, to assign a macro selected from the macro library 23 to each action represented in the flowchart, and to verify the functions in flowcharts. The flowchart is converted into an intermediate form (statelist) and input to the Cell Selector.

The Cell Selector uses a rule based expert system to select the appropriate cell or cells to perform each action. If the cell library has a number of cells with different geometries for performing the operation specified by the macro, then an appropriate cell can be selected on the basis of factors such as cell function, process technology used, time delay, power consumption, etc.

The knowledge base of Cell Selector 32 contains information (rules) relating to:

- (1) selection of macros
- (2) merging two macros

9

- (3) mapping of macros to cells
- (4) merging two cells
- (5) error diagnostics

The above information is stored in the knowledge base 35 as rules.

Cell List Generation

FIG. 9 shows the cell list generation steps. The first step of cell list generation is the transformation of the flowchart description into a structure that can be used by the Cell Selector. This structure is called the statelist. The blocklist is generated from the statelist by the inference engine. The blocklist contains a list of the functional blocks to be used in the integrated circuit. Rules of the following type are applied during this stage.

- map arguments to data paths
- map actions to macros
- connect these blocks

Rules also provide for optimization and error diagnostics at this level.

The cell selector maps the blocks to cells selected from the cell library 34. It selects an optimum cell for a block. This involves the formulation of rules for selecting appropriate cells from the cell library. Four types of information are stored for each cell. These are:

- (1) functional level information: description of the cell at the register transfer level.
- (2) logic level information: description in terms of flip-flops and gates.
- (3) circuit level information: description at the transistor level.
- (4) Layout level information: geometrical mask level specification.

The attributes of a cell are:

- cell name
- description
- function
- width
- height
- status
- technology
- minimum delay
- typical delay
- maximum delay
- power
- file
- designer
- date
- comment
- inspector

In the cell selection process, the above information can be used. Some parameters that can be used to map macros to cells are:

- (1) name of macro
- (2) function to be performed
- (3) complexity of the chip
- (4) fabrication technology
- (5) delay time allowed
- (6) power consumption
- (7) bit size of macro data paths

Netlist Generation

The netlist is generated after the cells have been selected by PSCS. PSCS also uses the macro definitions for connecting the cell terminals to other cells. PSCS uses the state-to-state transition information from an intermediate form representation of a flowchart (i.e. the

4,922,432

10

statelist) to generate a netlist. PSCS contains the following knowledge for netlist generation:

- (1) Data path synthesis
- (2) Data path optimization
- (3) Macro definitions
- (4) Cell library
- (5) Error detection and correction

The above information is stored in the knowledge base 35 as rules. Knowledge engineers help in the formulation of these rules from ASIC design experts. The macro library 23 and the cell library 34 are stored in a database of KBSC.

A number of operations are performed by PSCS. The following is a top level description of PSCS operations:

- (1) Read the flowchart intermediate file and build a statelist.
 - (2) current_context = START
 - (3) Start the inference engine and load the current context rules.
 - (4) Perform one of the following operations depending upon current_context:
 - (a) Modify the statelist for correct implementation.
 - (b) Create blocklist, macrolist and data paths.
 - (c) Optimize blocklist and datapath list and perform error checks.
 - (d) Convert blocks to cells.
 - (e) Optimize cell list and perform error checks.
 - (f) Generate netlist.
 - (g) Optimize netlist and perform error checks and upon completion Goto 7.
 - (5) If current_context has changed, load new context rules.
 - (6) Goto 4.
 - (7) Output netlist file and stf files and Stop.
- In the following sections, operations mentioned in step 4 are described. The Rule Language and PSCS display are also described.

Rule Language

- The rule language of PSCS is designed to be declarative and to facilitate rule editing. In order to make the expert understand the structure of the knowledge base, the rule language provides means for knowledge representation. This will enable the format of data structures to be stated in the rule base, which will enable the expert to refer to them and understand the various structures used by the system. For example, the expert can analyze the structure of wire and determine its components. The expert can then refer these components into rules. If a new object has to be defined, then the expert can declare a new structure and modify some existing structure to link to this new structure. In this way, the growth of the data structures can be visualized better by the expert. This in turn helps the designer to update and append rules.

The following features are included in the rule language:

- (i) Knowledge representation in the form of a record structure.
- (ii) Conditional expressions in the antecedent of a rule.
- (iii) Facility to create and destroy structure in rule actions.
- (iv) The assignment statement in the action of a rule.
- (v) Facility for input and output in rule actions.
- (vi) Provide facility to invoke C functions from rule actions.

The rule format to be used is as follows:

11

4,922,432

The rule format to be used is as follows:		
Rule	<number>	<context>
If {	<If-clause>	
}		
Then {	<then-clause>	
}		
where	<number>	rule number
	<context>	context in which this rule is active
	<If-clause>	the condition part of the rule
	<then-clause>	the action part of the rule

Inference Strategy

The inference strategy is based on a fast pattern matching algorithm. The rules are stored in a network and the requirement to iterate through the rules is avoided. This speeds up the execution. The conflict resolution strategy to be used is based on the following:

- (1) The rule containing the most recent data is selected.
- (2) The rule which has the most complex condition is selected.
- (3) The rule declared first is selected.

Rule Editor

PSCS provides an interactive rule editor which enables the expert to update the rule set. The rules are stored in a database so that editing capabilities of the database package can be used for rule editing. To perform this operation the expert needs to be familiar with the various knowledge structures and the inferencing process. If this is not possible, then the help of a knowledge engineer is needed.

PSCS provides a menu from which various options can be set. Mechanisms are provided for setting various debugging flags and display options, and for the overall control of PSCS.

Facility is provided to save and display the blocklist created by the user. The blocklist configuration created by the user can be saved in a file and later be printed with a plotter. Also the PSCS display can be reset to restart the display process.

PSCS Example Rules:		
Rule 1	IF	no blocks exist
	THEN	generate a system controller.
Rule 2	IF	a state exists which has a macro AND this macro has not been mapped to a block
	THEN	find a corresponding macro in the library and generate a block for this macro.
Rule 3	IF	there is a transition between two states AND there are macros in these states using the same argument
	THEN	make a connection from a register corresponding to the first macro to another register corresponding to the second macro.
Rule 4	IF	a register has only a single connection from another register
	THEN	combine these registers into a single register.
Rule 5	IF	there are two comparators AND input data widths are of the same size AND

12

-continued

PSCS Example Rules:		
		one input of these is same AND the outputs of the comparators are used to perform the same operation. combine these comparators into a single comparator.
	THEN	
Rule 6	IF	there is a data without a register
	THEN	allocate a register for this data.
Rule 7	IF	all the blocks have been interconnected AND a block has a few terminals not connected
	THEN	remove the block and its terminals. or issue an error message.
Rule 8	IF	memory is to be used, but a block has not been created for it
	THEN	create a memory block with data, address, read and write data and control terminals.
Rule 9	IF	a register has a single connection to a counter
	THEN	combine the register and the counter; remove the register and its terminals.
Rule 10	IF	there are connections to a terminal of a block from many different blocks
	THEN	insert a multiplexor; remove the connections to the terminals and connect them to the input of the multiplexor; connect the output of the multiplexor to the input of the block.

Additional rules address the following points:
 remove cell(s) that can be replaced by using the outputs of other cell(s)
 reduce multiplexor trees
 use fan-out from the cells, etc.

Soft Drink Vending Machine Controller Design Example

The following example illustrates how the previously described features of the present invention are employed in the design of an application specific integrated circuit (ASIC). In this illustrative example the ASIC is designed for use as a vending machine controller. The vending machine controller receives a signal each time a coin has been deposited in a coin receiver. The coin value is recorded and when coins totalling the correct amount are received, the controller generates a signal to dispense a soft drink. When coins totalling more than the cost of the soft drink are received, the controller dispenses change in the correct amount.

This vending machine controller example is patterned after a textbook example used in teaching digital system controller design. See Fletcher, William L, *An Engineering Approach to Digital Design*, Prentice-Hall, Inc., pp. 491-505. Reference may be made to this textbook example for a more complete explanation of this vending machine controller requirements, and for an understanding and appreciation of the complex design procedures prior to the present invention for designing the hardware components for a controller.

FIG. 10 illustrates a flowchart for the vending machine controller system. This flowchart would be entered into the KBSC system by the user through the flowchart editor. Briefly reviewing the flowchart, the controller receives a coin present signal when a coin is received in the coin receiver. State0 and cond0 define a waiting state awaiting deposit of a coin. The symbol CP represents "coin present" and the symbol ICP repre-

4,922,432

13

sents "coin not present". State1 and cond1 determine when the coin has cleared the coin receiver. At state20, after receipt of a coin, the macro instruction ADD3.1 (lc, cv, sum) instructs the system to add lc (last coin) and cv (coin value) and store the result as sum. The macro instruction associated with state21 moves the value in the register sum to cv. The macro CMP.1 at state22 compares the value of cv with PR (price of soft drink) and returns signals EQ, GT and LT. The condition cond2 tests the result of the compare operation CMP.1. If the result is "not greater than" (IGT.CMP.1), then the condition cond3 tests to see whether the result is "equal" (EQ.CMP.1). If the result is "not equal" (IEQ.CMP.1), then control is returned to state0 awaiting the deposit of another coin. If cond3 is EQ, then state4 generates a control signal to dispense a soft drink (droppop) and the macro instruction CLR.1(cv) resets cv to zero awaiting another customer.

If the total coins deposited exceed the price, then state30 produces the action "returncoin". Additionally, the macro DECR.1 (cv) reduces the value of cv by the amount of the returned coin. At state31 cv and PR are again compared. If cv is still greater than PR, then control passes to state30 for return of another coin. The condition cond5 tests whether the result of CMP.2 is EQ and will result in either dispensing a drink (droppop) true or branching to state0 awaiting deposit of another coin. The macros associated with the states shown in FIG. 10 correspond to those defined in Table 1 above and define the particular actions which are to be performed at the respective states.

Appendix A shows the intermediate file or "statelist" produced from the flowchart of FIG. 10. This statelist is produced as output from the EDSIM program 20 and is used as input to the PSCS program 30 (FIG. 3).

FIG. 11 illustrates for each of the macros used in the flowchart of FIG. 10, the corresponding hardware blocks. It will be seen that the comparison macro CMP (A,B) results in the generation of a register for storing value A, a register for storing value B, and a comparator block and also produces control paths to the system controller for the EQ, LT, and GT signals generated as a result of the comparison operation. The addition macro ADD (A,B,C) results in the generation of a register for each of the input values A and B, a register for the output value C, and in the generation of an adder block. The macro DECR (A) results in the generation of a counter block. The PSCS program 30 maps each of the macros used in the flowchart of FIG. 10 to the corresponding hardware components results in the generation of the hardware blocks shown in FIG. 12. In generating the illustrated blocks, the PSCS program 30 relied upon rules 1 and 2 of the above listed example rules.

FIG. 13 illustrates the interconnection of the block of FIG. 12 with data paths and control paths. Rule 3 was used by the data/control path synthesizer program 31 in mapping the data and control paths.

FIG. 14 shows the result of optimizing the circuit by applying rule 4 to eliminate redundant registers. As a result of application of this rule, the registers R2, R3, R7, R8, and R9 in FIG. 13 were removed. FIG. 15 shows the block diagram after further optimization in which redundant comparators are consolidated. This optimization is achieved in the PSCS program 30 by application of rule 5.

Having now defined the system controller block, the other necessary hardware blocks and the data and con-

14

trol paths for the integrated circuit, the PSCS program 30 now generates a netlist 15 defining these hardware components and their interconnection requirements. From this netlist the mask data for producing the integrated circuit can be directly produced using available VLSI CAD tools.

```
name rpop;
data path @ic<0.5>, cv<0.5>, sum<0.5>, @pr<0.5>;
{
state4 : state0;
state30 : state31;
state21 : state22;
state20 : state21;
state0 : lcp state0;
state0 : cp state1;
state1 : cp state1;
state1 : lcp state20;
state22 : GT.CMP.1 state30;
state22 : IGT.CMP.1*EQ.CMP.1 state4;
state22 : IGT.CMP.1*IEQ.CMP.1 state0;
state31 : GT.CMP.2 state30;
state31 : IGT.CMP.2*EQ.CMP.2 state4;
state31 : IGT.CMP.2*IEQ.CMP.2 state0;
state30 : returncoin;
state30 : DECR.1(cv);
state4 : droppop;
state4 : CLR.1(cv);
state31 : CMP.2(cv,pr);
state22 : CMP.1(cv,pr);
state21 : MOVE.1(sum,cv);
state20 : ADD3.1(lc,cv,sum);
}
```

That which I claimed is:

1. A computer-aided design system for designing an application specific integrated circuit directly from architecture independent functional specifications for the integrated circuit, comprising

a macro library defining a set of architecture independent operations comprised of actions and conditions;

input specification means operable by a user for defining architecture independent functional specifications for the integrated circuit, said functional specifications being comprised of a series of operations comprised of actions and conditions, said input specification means including means to permit the user to specify for each operation a macro selected from said macro library;

a cell library defining a set of available integrated circuit hardware cells for performing the available operations defined in said macro library;

cell selection means for selecting from said cell library for each macro specified by said input specification means, appropriate hardware cells for performing the operation defined by the specified macro, said cell selection means comprising an expert system including a knowledge base containing rules for selecting hardware cells from said cell library and inference engine means for selecting appropriate hardware cells from said cell library in accordance with the rules of said knowledge base; and

netlist generator means cooperating with said cell selection means for generating as output from the system a netlist defining the hardware cells which are needed to achieve the functional requirements of the integrated circuit and the connections therebetween.

2. The system as defined in claim 1 wherein said input means comprises means specification for receiving user

4,922,432

15

input of a list defining the series of actions and conditions.

3. The system as defined in claim 1 additionally including mask data generator means for generating from said netlist the mask data required to produce an integrated circuit having the specified functional requirements.

4. The system as defined in claim 1 wherein said input means comprises flowchart editor means specification for creating a flowchart having elements representing said series of actions and conditions.

5. The system as defined in claim 4 additionally including flowchart simulator means for simulating the functions defined in the flowchart to enable the user to verify the operation of the integrated circuit.

6. The system as defined in claim 1 additionally including data path generator means cooperating with said cell selection means for generating data paths for the hardware cells selected by said cell selection means.

7. The system as defined in claim 6 wherein said data path generator means comprises a knowledge base containing rules for selecting data paths between hardware cells and inference engine means for selecting data paths between the hardware cells selected by said cell selection means in accordance with the rules of said knowledge base and the arguments of the specified macros.

8. The system as defined in claim 6 additionally including control generator means for generating a controller and control paths for the hardware cells selected by said cell selection means.

9. A computer-aided design system for designing an application specific integrated circuit directly from a flowchart defining architecture independent functional requirements of the integrated circuit comprising

a macro library defining a set of architecture independent operations comprised of actions and conditions;

flowchart editor means operable by a user for creating a flowchart having elements representing said architecture independent operations;

said flowchart editor means including macro specification means for permitting the user to specify for each operation represented in the flowchart a macro selected from said macro library;

a cell library defining a set of available integrated circuit hardware cells for performing the available operations defined in said macro library;

cell selection means for selecting from said cell library for each specified macro, appropriate hardware cells for performing the operation defined by the specified macro, said cell selection means comprising an expert system including a knowledge base containing rules for selecting hardware cells from said cell library and inference engine means for selecting appropriate hardware cells from said cell library in accordance with the rules of said knowledge base; and

data path generator means cooperating with said cell selection means for generating data paths for the hardware cells selected by said cell selector means, said data path generator means comprising a knowledge base containing rules for selecting data paths between hardware cells and inference engine means for selecting data paths between hardware cells selected by said cell selection means in accordance with the rules of said knowledge base and the arguments of the specified macros.

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10. The system as defined in claim 9 additionally including control generator means for generating a controller and control paths for the hardware cells selected by said cell selection means.

11. A computer-aided design system for designing an application specific integrated circuit directly from a flowchart defining architecture independent functional requirements of the integrated circuit, comprising

flowchart editor means operable by a user for creating a flowchart having boxes representing architecture independent actions, diamonds representing architecture independent conditions, and lines with arrows representing transitions between actions and condition and including means for specifying for each box or diamond, a particular action or condition to be performed;

a cell library defining a set of available integrated circuit hardware cells for performing actions and conditions;

a knowledge base containing rules for selecting hardware cells from said cell library and for generating data and control paths for hardware cells; and expert system means operable with said knowledge base for translating the flowchart defined by said flowchart editor means into a netlist defining the necessary hardware cells and data and control paths required in an integrated circuit having the specified functional requirements.

12. The system as defined in claim 11 including mask data generator means for generating from said netlist the mask data required to produce an integrated circuit having the specified functional requirements.

13. A computer-aided design process for designing an application specific integrated circuit which will perform a desired function comprising

storing a set of definitions of architecture independent actions and conditions;

storing data describing a set of available integrated circuit hardware cells for performing the actions and conditions defined in the stored set;

storing in an expert system knowledge base a set of rules for selecting hardware cells to perform the actions and conditions;

describing for a proposed application specific integrated circuit a series of architecture independent actions and conditions;

specifying for each described action and condition of the series one of said stored definitions which corresponds to the desired action or condition to be performed; and

selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell for performing the desired function of the application specific integrated circuit, said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed, a set of cell selection rules stored in said expert system knowledge base and generating for the selected integrated circuit hardware cells, a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit and the interconnection requirements therefor.

14. A process as defined in claim 13, including generating from the netlist the mask data required to produce an integrated circuit having the desired function.

4,922,432

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15. A process as defined in claim 13 including the further step of generating data paths for the selected integrated circuit hardware cells.

16. A process as defined in claim 15 wherein said step of generating data paths comprises applying to the selected cells a set of data path rules stored in a knowledge base and generating the data paths therefrom.

17. A process as defined in claim 16 including the further step of generating control paths for the selected integrated circuit hardware cells.

18. A knowledge based design process for designing an application specific integrated circuit which will perform a desired function comprising

storing in a macro library a set of macros defining architecture independent actions and conditions;

storing in a cell library a set of available integrated circuit hardware cells for performing the actions and conditions;

storing in a knowledge base set of rules for selecting hardware cells from said cell library to perform the actions and conditions defined by the stored macros;

describing for a proposed application specific integrated circuit a flowchart comprised of elements representing a series of architecture independent

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actions and conditions which carry out the function to be performed by the integrated circuit; specifying for each described action and condition of said series a macro selected from the macro library which corresponds to the action or condition; and applying rules of said knowledge base to the specified macros to select from said cell library the hardware cells required for performing the desired function of the application specific integrated circuit and generating for the selected integrated circuit hardware cells, a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit and the interconnection requirements therefor.

19. A process as defined in claim 18 also including the steps of storing in said knowledge base a set of rules for creating data paths between hardware cells, and applying rules of said knowledge base to the specified means to create data paths for the selected hardware cells.

20. A process as defined in claim 19 also including the steps of generating a controller and generating control paths for the selected hardware cells.

* * * * *

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 4,922,432

Page 1 of 4

DATED : May 1, 1990

INVENTOR(S) : Hideaki Kobayashi, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

ON TITLE PAGE: under the section "References Cited" under "Other Publications":

"Verifying Compiled Silicon", by E. K. cheng, VLSI Design, Oct. 1984, pp. 1-4." should be -- "Verifying Compiled Silicon", by E. K. Cheng, VLSI Design, Oct. 1984, pp. 1-4." --.

"quality of Designs from An Automatic Logic Generator", by T. D. Friedman et al., IEEE 7th DA Conference, 1970, pp. 71-89." should be -- "Quality of Designs from An Automatic Logic Generator", by T. D. Friedman et al., IEEE 7th DA Conference, 1970, pp. 71-89. --.

"Trevillyan-Trickey, H., Flamel: A High Level Hardward Compiler, IEEE Transactions On Computer Aided Design, Mar. 1987, pp. 259-269." should be -- Trevillyan-Trickey, H., Flamel: A High Level Hardware Compiler, IEEE Transactions On Computer Aided Design, Mar. 1987, pp. 259-269. --.

In the abstract:

Every occurrence of "functional architecture independent" should be -- architecture independent functional --.

Column 1, line 19, "a" should be -- an --.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 4,922,432

Page 2 of 4

DATED : May 1, 1990

INVENTOR(S) : Hideaki Kobayashi, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 2, line 10, "functional architecture independent" should be -- architecture independent functional --.

Column 2, line 21, "functional architecture independent" should be -- architecture independent functional --.

Column 2, lines 29-30, "functional architecture independent" should be -- architecture independent functional --.

Column 2, line 31, "structural" should be after "specific".

Column 3, lines 51-52, "representation" should be after "architecture independent".

Column 3, lines 61-62, "integrated" should be after "specific".

Column 6, line 62, after "22" insert -- . --.

Column 7, line 43 (in Table 1), "C = A B" should be -- C = A^B --.

Column 8, line 9 should end with the word "flowchart" and "history" should begin on the next line.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 4,922,432

Page 3 of 4

DATED : May 1, 1990

INVENTOR(S) : Hideaki Kobayashi, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10, line 23, "data paths" should be
-- datapaths --.

Column 10, line 68, delete "The rule format to be used is
as follows:".

Column 12, line 54, "Engineering" should be
-- Engineering --.

Column 13, line 55, "block" should be -- blocks --.

In the Claims:

Column 14, line 68, before "means" (first occurrence)
insert -- specification --; after "means" (second
occurrence) delete "specification".

Column 15, line 9, before "means" (first occurrence)
insert -- specification --; after "means" (second
occurrence) delete "specification".

Column 15, line 35, after "circuit" insert -- , --.

Column 15, line 36, "marco" should be -- macro --.

Column 15, line 49, "form" should be -- from --.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 4,922,432

Page 4 of 4

DATED : May 1, 1990

INVENTOR(S) : Hideaki Kobayashi, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 16, line 14, "condition" should be
-- conditions --.

Column 17, line 19, after "base" insert -- a --.

Signed and Sealed this
Fourteenth Day of January, 1992

Attest:

HARRY F. MANBECK, JR.

Attesting Officer

Commissioner of Patents and Trademarks

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6
7 UNITED STATES DISTRICT COURT
8 NORTHERN DISTRICT OF CALIFORNIA
9 SAN FRANCISCO DIVISION
10

11
12) Case No. CV 03-04669 MJJ
13)
RICOH COMPANY LTD.,)
14) **THIRD PARTY SYNOPSIS, INC.'S**
Plaintiff,) **OBJECTIONS AND RESPONSES TO**
15) **PLAINTIFF'S DEPOSITION SUBPOENA**
v.)
16)
AEROFLEX INC., ET AL.,)
17)
Defendants.)

18 Pursuant to Rule 45(c)(2)(B) of the Federal Rules of Civil Procedure, Third-Party Synopsys,
19 Inc. ("Synopsys") hereby responds to Plaintiff Ricoh Company, Ltd.'s ("RicoH") deposition subpoena
20 ("Subpoena").

21 This response is made without waiving, in any way: (1) the right to object on any basis
22 permitted by law to the use of any such information, for any purpose, in whole or in part, in any
23 subsequent proceeding in this action or any other action; and (2) the right to object on any basis
24 permitted by law to any other discovery request or proceeding involving or relating to the subject
25 matter of this response.

26 **GENERAL OBJECTIONS**

27 1. Synopsys objects to the date noticed for the deposition. The deposition will be
28 scheduled at a date and time that are convenient for the parties and witnesses.

1 2. Synopsisys objects to the Subpoena to the extent that the topics seek information neither
2 relevant to any cause of action in the action nor reasonably calculated to lead to the discovery of
3 admissible evidence.

4 3. Synopsisys objects to the Subpoena to the extent that the topics seek information
5 protected by: (i) the attorney-client privilege; (ii) the work-product doctrine; (iii) the constitutional
6 right to privacy; or (iv) any other privilege or protection afforded by state or federal law. Such
7 protected material may include the impressions, conclusions, opinions, legal research or theories of
8 attorneys, whether or not communicated to their client, and/or any other applicable privilege. Any
9 inadvertent production of information subject to any such privilege or protection shall not be deemed a
10 waiver of any privilege or protection with respect to such information. Synopsisys will provide only
11 responsive information that is not subject to any such privilege or protection.

12 4. Synopsisys objects to the Subpoena to the extent that the topics seek information that is a
13 matter of public record or is obtainable from some other source that is more convenient, less
14 burdensome, or less expensive.

15 5. Synopsisys objects to Ricoh's subpoena as violating Federal Rule of Civil Procedure
16 45(b)(1). The subpoena was did not provide fees or mileage for one's days attendance at a deposition.

17 6. Synopsisys objects to Definition a on the grounds that it is unduly burdensome,
18 overbroad, and purports to impose obligations on Synopsisys far beyond those imposed by the Federal or
19 Local Rules.

20 7. Synopsisys objects to Ricoh's Definition c to the extent that the term "Synopsisys, Inc."
21 extends to any person or entity other than Synopsisys' present employees and agents.

22 8. Synopsisys objects to Ricoh's Definition j to the extent that it purports to impose
23 requirements other than or in addition to the requirements of the Federal Rules of Civil Procedure and
24 the Local Rules of this Court.

25 9. Synopsisys objects to Ricoh's Definition m to the extent that the definition of "ASIC
26 Product" is vague and overly broad. Synopsisys further objects to the inclusion of products dating back
27 to 1990. Under any set of circumstances, Ricoh would be barred from claiming damages for activities
28 dating back to 1990.

1 10. Synopsys objects to Ricoh's Definition n on the basis that the definition of "ASIC
2 Design System" is vague and overly broad. Synopsys further objects to the inclusion of products
3 dating back to 1990. Under any set of circumstances, Ricoh would be barred from claiming damages
4 for activities dating back to 1990.

5 11. Synopsys objects to Ricoh's Definition o to the extent that the definition of "ASIC
6 Method" is vague and overly broad. Synopsys further objects to the inclusion of products dating back
7 to 1990. Under any set of circumstances, Ricoh would be barred from claiming damages for activities
8 dating back to 1990.

9
10 **THIRD PARTY SYNOPSIS, INC.'S OBJECTIONS TO SPECIFIC RULE 30(b)(6)**
11 **DEPOSITION TOPICS FROM RICOH'S SUBPOENA**

12 **DEPOSITION TOPIC 1:**

13 The marketing of any Synopsys ASIC Design System and/or the use thereof.

14 **RESPONSE TO DEPOSITION TOPIC 1:**

15 In addition to its general objections, Synopsys further objects to this deposition topic on the
16 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
17 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
18 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
19 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
20 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Marketing of
21 Synopsys products is, therefore, irrelevant to this case. Synopsys is not a party to the present suit and
22 it is unreasonably burdensome to ask Synopsys to produce such discovery in this suit. Therefore,
23 Synopsys will not produce a witness to testify in response to this deposition topic.

24
25 **DEPOSITION TOPIC 2:**

26 Any relationship, including, but not limited to, any contractual, business, or financial
27 relationship, between Synopsys and any and all defendants.

28

1 RESPONSE TO DEPOSITION TOPIC 2:

2 In addition to its general objections, Synopsys further objects to this deposition topic on the
3 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
4 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
5 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
6 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
7 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Contractual
8 relationships between Synopsys and the defendants are irrelevant to this case. Synopsys is not a party
9 to the present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery in this
10 suit. Therefore, Synopsys will not produce a witness to testify in response to this deposition topic.

11
12 DEPOSITION TOPIC 3:

13 Any product, including, but not limited to any software, Synopsys sold, licensed, leased, lent,
14 gave, or otherwise (directly or indirectly) provided to any defendant.

15 RESPONSE TO DEPOSITION TOPIC 3:

16 In addition to its general objections, Synopsys further objects to this deposition topic on the
17 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
18 and not reasonably calculated to lead to the discovery of admissible evidence.

19 While reserving its general and specific objections, Synopsys is prepared to provide a witness
20 to address the specific topic of which Synopsys products were licensed to any of the defendants.

21
22 DEPOSITION TOPIC 4:

23 Any ASIC Design System Synopsys sold, licensed, leased, lent, gave, or otherwise (directly or
24 indirectly) provided to any defendant.

25 RESPONSE TO DEPOSITION TOPIC 4:

26 In addition to its general objections, Synopsys further objects to this deposition topic on the
27 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
28 and not reasonably calculated to lead to the discovery of admissible evidence.

1 While reserving its general and specific objections, Synopsys is prepared to provide a witness
2 to address the specific topic of which Synopsys products were licensed to any of the defendants.

3
4 DEPOSITION TOPIC 5:

5 Any agreement or other arrangement granting rights in or otherwise concerning ASIC Design
6 Systems and/or use thereof from Synopsys to any defendant (or from any defendant to Synopsys),
7 including but not limited to contracts, licenses, purchase agreements, indemnification agreements, and
8 hold-harmless agreement/covenants not to sue.

9 RESPONSE TO DEPOSITION TOPIC 5:

10 In addition to its general objections, Synopsys further objects to this deposition topic on the
11 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
12 and not reasonably calculated to lead to the discovery of admissible evidence.

13 While reserving its general and specific objections, Synopsys is prepared to provide a witness
14 to address the specific topic of the contractual arrangement between Synopsys and the defendants
15 pursuant to which Synopsys products were licensed to any of the defendants.

16
17 DEPOSITION TOPIC 6:

18 The identity of the person that participated in the design of Synopsys':

- 19 a. ASIC Design Systems,
20 b. Socrates system,
21 c. Behavioral Compiler,
22 d. CoCentric System C Compiler,
23 e. Module Compiler,
24 f. cell libraries (e.g., DesignWare Library and DesignWare Foundation Libraries),
25 g. Design Compiler,
26 h. hardware cell selection components, software and processes used by Design
27 Compiler, and
28

- 1 i. ASIC Design System user interface, including (without limitation) the components,
2 software and processes used to interface between the user (using such input as HDL,
3 VHDL, Verilog, or any other form) and ASIC Design Systems.

4 RESPONSE TO DEPOSITION TOPIC 6:

5 In addition to its general objections, Synopsys further objects to this deposition topic on the
6 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
7 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
8 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
9 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
10 Synopsys products and Ricoh's patents. Those issues are not pending in this case. The identity of the
11 persons involved in the development of Synopsys software products is irrelevant to this case.
12 Synopsys is not a party to the present suit and it is unreasonably burdensome to ask Synopsys to
13 produce such discovery in this suit. Therefore, Synopsys will not produce a witness to testify in
14 response to this deposition topic.

15
16 DEPOSITION TOPIC 7:

17 The design, capabilities, features, functions, operation, and use of Synopsys':

- 18 a. ASIC Design Systems,
19 b. Socrates system,
20 c. Behavioral Compiler,
21 d. CoCentric System C Compiler,
22 e. Module Compiler,
23 f. cell libraries (e.g., DesignWare Library and DesignWare Foundation Libraries),
24 g. Design Compiler,
25 h. hardware cell selection components, software and processes used by Design
26 Compiler, and
27 i. ASIC Design System user interface, including (without limitation) the components,
28 software and processes used to interface between the user (using such input as HDL,

VHDL, Verilog, or any other form) and ASIC Design Systems., or any other form)
and ASIC Design Systems.

RESPONSE TO DEPOSITION TOPIC 7:

In addition to its general objections, Synopsys further objects to this deposition topic on the basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome, and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of Delaware and Northern California have determined that Synopsys's declaratory judgment action has priority as the venue for addressing any issues regarding the relationship, or lack thereof, between Synopsys products and Ricoh's patents. Those issues are not pending in this case. The design characteristics of Synopsys software products are therefore irrelevant to this case. Synopsys is not a party to the present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery in this suit. Therefore, Synopsys will not produce a witness to testify in response to this deposition topic.

DEPOSITION TOPIC 8:

The identity of the person or persons that participated in the programming, or implementation of any Synopsys:

- a. ASIC Design Systems,
- b. Socrates system,
- c. Behavioral Compiler,
- d. CoCentric System C Compiler,
- e. Module Compiler,
- f. cell libraries (e.g., DesignWare Library and DesignWare Foundation Libraries),
- g. Design Compiler,
- h. hardware cell selection components, software and processes used by Design Compiler, and ASIC Design System user interface, including (without limitation) the components, software and processes used to interface between the user (using such input as HDL, VHDL, Verilog, or any other form) and ASIC Design Systems.

RESPONSE TO DEPOSITION TOPIC 8:

In addition to its general objections, Synopsys further objects to this deposition topic on the basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome, and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of Delaware and Northern California have determined that Synopsys's declaratory judgment action has priority as the venue for addressing any issues regarding the relationship, or lack thereof, between Synopsys products and Ricoh's patents. Those issues are not pending in this case. The identity of persons who participated in the programming of Synopsys software products is therefore irrelevant to this case. Synopsys is not a party to the present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery in this suit. Therefore, Synopsys will not produce a witness to testify in response to this deposition topic.

DEPOSITION TOPIC 9:

The programming, or implementation of any Synopsys:

- a. ASIC Design Systems,
- b. Socrates system,
- c. Behavioral Compiler,
- d. CoCentric System C Compiler,
- e. Module Compiler,
- f. cell libraries (e.g., DesignWare Library and DesignWare Foundation Libraries),
- g. Design Compiler,
- h. hardware cell selection components, software and processes used by Design Compiler, and ASIC Design System user interface, including (without limitation) the components, software and processes used to interface between the user (using such input as HDL, VHDL, Verilog, or any other form) and ASIC Design Systems.

RESPONSE TO DEPOSITION TOPIC 9:

In addition to its general objections, Synopsys further objects to this deposition topic on the basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,

1 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
 2 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
 3 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
 4 Synopsys products and Ricoh's patents. Those issues are not pending in this case. The programming
 5 or implementation of Synopsys software products is therefore irrelevant to this case. Synopsys is not a
 6 party to the present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery
 7 in this suit. Therefore, Synopsys will not produce a witness to testify in response to this deposition
 8 topic.

9

10 DEPOSITION TOPIC 10:

11 The identity of the person or persons that wrote, or participated in the writing of manuals, users
 12 guides, technical papers, or training materials, describing the use of Synopsys':

- 13 a. ASIC Design Systems,
- 14 b. Socrates system,
- 15 c. Behavioral Compiler,
- 16 d. CoCentric System C Compiler,
- 17 e. Module Compiler,
- 18 f. cell libraries (e.g., DesignWare Library and DesignWare Foundation Libraries),
- 19 g. Design Compiler,
- 20 h. hardware cell selection components, software and processes used by Design
- 21 Compiler, and ASIC Design System user interface, including (without limitation)
- 22 the components, software and processes used to interface between the user (using
- 23 such input as HDL, VHDL, Verilog, or any other form) and ASIC Design Systems.

24 RESPONSE TO DEPOSITION TOPIC 10:

25 In addition to its general objections, Synopsys further objects to this deposition topic on the
 26 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
 27 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
 28 Delaware and Northern California have determined that Synopsys's declaratory judgment action has

1 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
2 Synopsys products and Ricoh's patents. Those issues are not pending in this case. The identity of
3 persons who prepared technical documentation for Synopsys software products are therefore irrelevant
4 to this case. Synopsys is not a party to the present suit and it is unreasonably burdensome to ask
5 Synopsys to produce such discovery in this suit. Therefore, Synopsys will not produce a witness to
6 testify in response to this deposition topic.

7

8 DEPOSITION TOPIC 11:

9 The manuals, user guides, technical papers, or training materials describing the use of
10 Synopsys':

- 11 a. ASIC Design Systems,
- 12 b. Socrates system,
- 13 c. Behavioral Compiler,
- 14 d. CoCentric System C Compiler,
- 15 e. Module Compiler,
- 16 f. cell libraries (e.g., DesignWare Library and DesignWare Foundation Libraries),
- 17 g. Design Compiler,
- 18 h. hardware cell selection components, software and processes used by Design
19 Compiler, and ASIC Design System user interface, including (without limitation)
20 the components, software and processes used to interface between the user (using
21 such input as HDL, VHDL, Verilog, or any other form) and ASIC Design Systems.

22 RESPONSE TO DEPOSITION TOPIC 11:

23 In addition to its general objections, Synopsys further objects to this deposition topic on the
24 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
25 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
26 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
27 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
28 Synopsys products and Ricoh's patents. Those issues are not pending in this case. The identification

1 of technical documentation for Synopsys software products is therefore irrelevant to this case.
2 Synopsys is not a party to the present suit and it is unreasonably burdensome to ask Synopsys to
3 produce such discovery in this suit. Therefore, Synopsys will not produce a witness to testify in
4 response to this deposition topic.

5
6 DEPOSITION TOPIC 12:

7 The capabilities, features, functions, operation, and use of the output of Synopsys' ASIC
8 Design Systems, including but not limited to the netlist output in an ASIC Method.

9 RESPONSE TO DEPOSITION TOPIC 12:

10 In addition to its general objections, Synopsys further objects to this deposition topic on the
11 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
12 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
13 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
14 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
15 Synopsys products and Ricoh's patents. Those issues are not pending in this case. The capabilities of
16 Synopsys software products are therefore irrelevant to this case. Synopsys is not a party to the present
17 suit and it is unreasonably burdensome to ask Synopsys to produce such discovery in this suit.
18 Therefore, Synopsys will not produce a witness to testify in response to this deposition topic.

19
20 DEPOSITION TOPIC 13:

21 The identification of each individual from Synopsys (including their full name, address,
22 telephone number, job title and description, and employer) who participated in any way in any
23 discussions, communications, correspondence, or otherwise with any person from, or any agent
24 representing International Chip Corporation or Knowledge Based Silicon Corporation referring,
25 relating or regarding, directly or indirectly, the patent-in-suit.

26 RESPONSE TO DEPOSITION TOPIC 13:

27 While reserving its general objections, Synopsys is prepared to provide a witness to address
28 this topic.

1
2 DEPOSITION TOPIC 14:

3 Any discussions, communications, correspondence, or other contact by Synopsys with any
4 person from, or any agent representing International Chip Corporation or Knowledge Based Silicon
5 Corporation referring, relating or regarding, directly or indirectly, the patent-in-suit.

6 RESPONSE TO DEPOSITION TOPIC 14:

7 While reserving its general objections, Synopsys is prepared to provide a witness to address
8 this topic.

9
10 DEPOSITION TOPIC 15:

11 The identification of each individual from Synopsys (including their full name, address,
12 telephone number, job title and description, and employer) who was aware of the patent-in-suit prior to
13 January 20, 2003.

14 RESPONSE TO DEPOSITION TOPIC 15:

15 In addition to its general objections, Synopsys further objects to this deposition topic on the
16 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
17 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
18 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
19 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
20 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Whether
21 individuals at Synopsys were aware of the patent-in-suit and the identity of such persons is therefore
22 irrelevant to this case, except to the extent that it pertains to the subject matter of Deposition Topic 14.
23 Synopsys is not a party to the present suit and it is unreasonably burdensome to ask Synopsys to
24 produce such discovery in this suit. Therefore, except to the extent that this Topic overlaps with Topic
25 14, Synopsys will not produce a witness to testify in response to this deposition topic.

26
27 DEPOSITION TOPIC 16:

28 Any communications within Synopsys concerning the patent-in-suit.

1 RESPONSE TO DEPOSITION TOPIC 16:

2 In addition to its general objections, Synopsys further objects to this deposition topic on the
3 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
4 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
5 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
6 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
7 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Communications
8 internal to Synopsys regarding the '432 patent are therefore irrelevant to this case. Synopsys is not a
9 party to the present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery
10 in this suit. Therefore, Synopsys will not produce a witness to testify in response to this deposition
11 topic.

12
13 DEPOSITION TOPIC 17:

14 The identification of all documents concerning all materials presented to any of Synopsys'
15 personnel having managerial responsibility and all agendas or notes of meetings involving each
16 personnel which refer to, mention or discuss the patent-in-suit or any possible infringement thereof.

17 RESPONSE TO DEPOSITION TOPIC 17:

18 In addition to its general objections, Synopsys further objects to this deposition topic on the
19 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
20 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
21 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
22 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
23 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Because Synopsys
24 is a third party to this litigation, communications internal to Synopsys regarding this litigation are
25 therefore irrelevant to the merits of this case. Synopsys is not a party to the present suit and it is
26 unreasonably burdensome to ask Synopsys to produce such discovery in this suit. Therefore, Synopsys
27 will not produce a witness to testify in response to this deposition topic.

1 DEPOSITION TOPIC 18:

2 Any communications between Synopsys and any defendant concerning the patent-in-suit.

3 RESPONSE TO DEPOSITION TOPIC 18:

4 In addition to its general objections, Synopsys further objects to this deposition topic on the
5 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
6 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
7 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
8 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
9 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Because Synopsys
10 is a third party to this litigation, communications between Synopsys and the defendants to this case
11 regarding this litigation are therefore irrelevant to the merits of this case. Synopsys is not a party to the
12 present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery in this suit.
13 Therefore, Synopsys will not produce a witness to testify in response to this deposition topic.

14
15 DEPOSITION TOPIC 19:

16 Any communications between Synopsys and any person or entity other than [sic] the other [sic]
17 defendants concerning the patent-in-suit.

18 RESPONSE TO DEPOSITION TOPIC 19:

19 In addition to its general objections, Synopsys further objects to this deposition topic on the
20 basis that it is irrelevant to the issues in this litigation, and, therefore, overbroad, overly burdensome,
21 and not reasonably calculated to lead to the discovery of admissible evidence. The district courts of
22 Delaware and Northern California have determined that Synopsys's declaratory judgment action has
23 priority as the venue for addressing any issues regarding the relationship, or lack thereof, between
24 Synopsys products and Ricoh's patents. Those issues are not pending in this case. Because Synopsys
25 is a third party to this litigation, communications between Synopsys and parties that are not defendants
26 to this case regarding this litigation are therefore irrelevant to the merits of this case. Synopsys is not a
27 party to the present suit and it is unreasonably burdensome to ask Synopsys to produce such discovery

28

1 in this suit. Therefore, Synopsys will not produce a witness to testify in response to this deposition
2 topic.

3
4 DEPOSITION TOPIC 20:

5 The identification of each individual (including their full name, address, telephone number, job
6 title and description, and employer) who has knowledge of the factual basis for Count IV (Declaratory
7 Judgment Barring Ricoh From Recovery Under the Doctrine of Laches) of Synopsys' Complaint filed
8 May 15, 2003, in the United States District Court of the Northern District of California, assigned Case
9 No. C03 02289.

10 RESPONSE TO DEPOSITION TOPIC 20:

11 While reserving its general objections, Synopsys is willing to provide a witness to address this
12 topic.

13
14 DEPOSITION TOPIC 21:

15 The factual basis for Count V (Declaratory Judgment Barring Ricoh From Recovery Under the
16 Doctrine of Laches) of Synopsys' Complaint filed May 15, 2003, in the United States District Court of
17 Northern California, assigned Case No. C03 02289.

18 RESPONSE TO DEPOSITION TOPIC 21:

19 While reserving its general objections, Synopsys is willing to provide a witness to address this
20 topic.

21
22 DEPOSITION TOPIC 22:

23 The identification of each individual (including their full name, address, telephone number, job
24 title and description, and employer) who has knowledge of the factual basis for Count VI (Declaratory
25 Judgment Barring Ricoh From Recovery Under the Doctrine of Equitable Estoppel) of Synopsys'
26 Complaint filed May 15, 2003, in the United States District Court of Northern California, assigned
27 Case No. C03 02289.

1 RESPONSE TO DEPOSITION TOPIC 22:

2 While reserving its general objections, Synopsys is willing to provide a witness to address this
3 topic.

4
5 DEPOSITION TOPIC 23:

6 The factual basis for Count VI (Declaratory Judgment Barring Ricoh From Recovery Under the
7 Doctrine of Equitable Estoppel) of Synopsys' Complaint filed May 15, 2003, in the United States
8 District Court of Northern California, assigned Case No. C03 02289.

9 RESPONSE TO DEPOSITION TOPIC 23:

10 While reserving its general objections, Synopsys is willing to provide a witness to address this
11 topic.

12 Dated: November 12, 2003

HOWREY SIMON ARNOLD & WHITE, LLP

13
14
15 By: _____

16 Thomas C. Mavrakakis
Attorneys for Third-Party Synopsys, Inc.
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EXHIBIT 4

MITSUBISHI ELECTRIC CORPORATION, and MITSUBISHI ELECTRIC INDUSTRIAL CONTROLS, INC.,
Plaintiffs, v. IMS TECHNOLOGY, INC., HURCO COMPANIES, INC., and DOES 1-20, Defendants.

Case No. 96 C 0499

UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

1996 U.S. Dist. LEXIS 12239

August 21, 1996, Decided

August 21, 1996, FILED; August 22, 1996, DOCKETED

DISPOSITION: *1 Mitsubishi's motion for a stay
and/or injunction denied.

CASE SUMMARY

PROCEDURAL POSTURE: Plaintiff manufacturer brought a declaratory judgment suit against defendant patent owners seeking a determination that the patent was invalid, unenforceable, and not infringed by any process, or product made or sold by the manufacturer or its customers or distributors. The manufacturer filed a motion to stay and to enjoin the patent owner from proceeding with any infringement suits regarding the patent against the manufacturer's customers.

OVERVIEW: The manufacturer sought a stay as to the customers joined in the present suit and an injunction to restrain the patent owner from proceeding with any allegations of infringement against the customers using the product. The court held that judicial economy would not be served either by staying the infringement claims against the other parties in the case or by enjoining the patent owners' infringement claims against parties in a different case or against other customers or end-users. The patent owners alleged distinct infringement claims against each of these parties and while the manufacturer was a very important party, it was by no means the only interested defendant. The patent owners sought damages for the infringement of both apparatus and method claims. It was conceivable that the manufacturer's product could be non-infringing; however, its use by the other defendants could infringe on the method claim of the patent. None of defendants, named customers and end-users, indicated a willingness to be bound by judgment of the case. Little judicial efficiency would result from a stay or injunction. The injunctive relief relating to other customers would prove non-workable.

OUTCOME: The court denied the manufacturer's motion for a stay and/or an injunction.

CORE TERMS: customer, infringement, injunction, end-user, patent, manufacturer, enjoin, motion to stay, first-filed, infringe, manufactured, coordinated, discovery, judicial economy, apparatus, enjoining, work-piece, recommends, weighs, Local Rule, injunctive relief, recommendation, collectively, transferred, relatedness, pretrial, referral, unnamed, joined

LexisNexis(TM) HEADNOTES - Core Concepts

Civil Procedure > Jurisdiction > Subject Matter Jurisdiction > Jurisdiction Over Action

Civil Procedure > Entry of Judgments > Stay of Proceedings & Supersedeas

HN1 In the interests of judicial economy, a court has discretion to enjoin or stay parties under its jurisdiction from proceeding with a concurrent action involving the same or related issues.

Civil Procedure > Entry of Judgments > Stay of Proceedings & Supersedeas

Patent Law > Remedies > Injunctions

HN2 The "customer suit" exception permits stays where the first-filed action is brought against the customer of an offending manufacturer and a subsequent action is brought involving the manufacturer itself. The exception was created on the assumption that a manufacturer has a greater interest in defending patent infringement actions than a customer or end-user. Critical considerations to be weighed in deciding whether to stay or enjoin such suits are: whether or not all, or at least major, issues regarding the customers will be resolved by the second suit; and whether or not the customers have agreed to be bound by the results, including liability for damages, flowing from the second suit.

Civil Procedure > Entry of Judgments > Stay of Proceedings & Supersedeas

Patent Law > Remedies > Injunctions

HN3 The willingness to be bound by judgment of the case strongly weighs against a stay or injunction because it increases the chance for duplicitous litigation.

COUNSEL: For Plaintiffs: JOHN W. KOZAK, Esq., MARK E. PHELPS, Esq., DAVID M. AIRAN, Esq., Leydig, Voit & Mayer, Ltd., Chicago, IL. LES J. WEINSTEIN, Esq., CHERYL L. JOHNSON, Esq., DANIEL E. ROBBINS, Esq., Graham & James, Los Angeles, CA.

For Defendants: RAYMOND P. NIRO, Esq., ROBERT A. VITALE, JR., Esq., RICHARD B. MEGLEY, Esq., MICHAEL S. LEE, Esq., Niro, Scavone, Haller &



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Page 9
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Niro, Ltd., Chicago, IL.

JUDGES: MARTIN C. ASHMAN, United States Magistrate Judge. Judge Ann C. Williams

OPINIONBY: MARTIN C. ASHMAN

OPINION: REPORT AND RECOMMENDATION

This case is one of three suits pending in the Northern District of Illinois which involve United States Patent No. B1 4,477,754 ("the '754 Patent"), held by IMS Technology, Inc. ("IMS"). n1 In two of the suits, IMS has brought infringement actions against manufacturers of computer numerical control systems ("CNC Systems") and their customers and end-users - 95 C 5779 and 96 C 3002. In the present case, Plaintiffs, Mitsubishi Electric Corporation and Mitsubishi Electric Industrial Controls, Inc. ("Mitsubishi"), have brought a declaratory judgment suit against IMS and Hurco Companies, Inc. ("Hurco") *2 seeking a determination that the '754 Patent is invalid, unenforceable, and not infringed by any process, or product made or sold by Mitsubishi or customers or distributors of Mitsubishi's CNC Systems or by any end-user of Mitsubishi-manufactured CNC Systems. At issue before this Court is Mitsubishi's motion to stay and to enjoin IMS from proceeding with any infringement suits, regarding the '754 Patent, against Mitsubishi's customers. For the following reasons, the Court recommends the denial of Mitsubishi's motion to stay and denial of Mitsubishi's motion for an injunction.

----- Footnotes -----

n1 IMS holds the rights, title and interest in United States Patent No. 4,477,754 entitled, "Interactive Machining System" issued on October 16, 1984 and confirmed on recommendation by the U.S. Patent Office on March 21, 1995 ("the '754 Patent"). The '754 Patent has 19 claims: Claims 1-10 and 16-19 claim an apparatus "for controlling the relative motion between a tool and a workpiece;" Claims 11-15 claim methods "for automatically and interactively performing machining operations on a workpiece."

----- End Footnotes-----

*3

Relevant Procedural History

The presence of three lawsuits relating to the same patent in this District has understandably precipitated some efforts at consolidation. As the judge assigned to the lowest numbered case, i.e., Case No. 95 C 5779,

Judge Charles P. Kocoras has issued several important orders affecting all three suits. First, on motion of certain defendants, Judge Kocoras severed them from Case No. 95 C 5779 and transferred them to one of the other two pending suits. Effectively, Judge Kocoras has aligned the customers and end-users with the manufacturer to whom they relate. (Docket Nos. 115, 116, 117). As a result, this case involves only CNC System equipment manufactured by Mitsubishi and includes customers and end-users of Mitsubishi-made equipment such as Yamazaki Mazak Corp., Yamazaki Mazak Trading Corp. and Mazak Corp. (collectively "the Mazak parties"), Machinery Systems, Inc. ("Machinery Systems") and Fox Tool Company, Inc. ("Fox Tool"). Case No. 95 C 5779 involves only CNC System equipment manufactured by Okuma Machinery Works, Ltd. and Okuma America Corporation ("Okuma") and Fanuc Ltd., including customers and end-users such as Ellison Machinery Company *4 of the Midwest ("Ellison"), Apollo Machine & Manufacturing Co., Inc. ("Apollo") and Nissan Motor Co., Ltd., Nissan Motor Car Carrier Co., Ltd. and Nissan Motor Corp USA, Inc. (collectively "the Nissan parties"). n2 Case No. 96 C 3002 involves CNC Systems equipment manufactured by Bridgeport Machine, Inc. ("Bridgeport") and Southwestern Industries, Inc. ("Southwestern") and includes customers and end-users such as Arpac Corporation ("Arpac") and American Control Technology, Inc. ("American Control").

----- Footnotes -----

n2 The Nissan parties' primary supplier of CNC Systems is Fanuc Ltd.; however, they have also purchased a few CNC Systems from Mitsubishi which they allegedly use outside the U.S.

----- End Footnotes-----

Second, on IMS's motion, Judge Kocoras referred all three cases to the Executive Committee for coordinated pretrial proceedings under Local Rule 2.30(G). (Docket No. 46). n3 Pursuant to this order, the parties have submitted to Judge Kocoras a proposed joint plan for coordinated discovery on common issues realigned and discovery on common *5 issues coordinated under Judge Kocoras with the parties. On August 6, 1996, Judge Kocoras clarified his previous orders and reaffirmed Judge Ann C. Williams' authority over the present case. Judge Kocoras further noted that this Magistrate Judge retained authority, under Judge Williams' referral, to enter a Report and Recommen-



dation on the motion to stay for injunction. Thus, the Court finds Mitsubishi's motion ripe for adjudication.

----- Footnotes -----

n3 Initially the Executive Committee interpreted Judge Kocoras' referral as being for reassessment for relatedness under Local Rule 2.31. However, on August 6, 1996, Judge Kocoras vacated the finding of relatedness and referred the cases only to coordinate pretrial proceedings.

----- End Footnotes -----

Mitsubishi seeks a stay as to their customers joined in the present suit; in addition, Mitsubishi seeks an injunction to restrain IMS from proceeding in Case No. 95 C 5779 with any allegations of infringement against the Nissan parties relating to their use of Mitsubishi-produced CNC Systems and to enjoin *6 IMS from bringing any further suits against Mitsubishi's customers. Mitsubishi argues that these measures are necessary to protect all of their customers from unnecessary litigation regarding Mitsubishi-manufactured equipment. Mitsubishi suggests that IMS has initiated its infringement litigation in an effort to improperly pressure Mitsubishi through its named customers and may do so with other, as yet unnamed, customers. On June 24, 1996, the Mazak parties, Fox Tool and Machining Systems joined Mitsubishi's call for a stay in this suit; in addition, Mazak Corp. requests a stay of its counterclaim against IMS.

HN1In the interests of judicial economy, a court has discretion to enjoin or stay parties under its jurisdiction from proceeding with a concurrent action involving the same or related issues. *In re Van Geuns*, 946 F.2d 845 (Fed. Cir. 1991). Generally, the first-filed suit takes priority in adjudication; however, Mitsubishi asserts that, under the "customer suit" exception, IMS's first-filed infringement claims against Mitsubishi customers and end-users (the Mazak parties, Machinery Systems and Fox Tool), which have been transferred into this suit, should be stayed pending resolution *7 of Mitsubishi's later-filed declaratory judgment action. Mitsubishi further argues that the "customer suit" exception warrants the enjoining of IMS's infringement action against the Nissan parties as it relates to the few Mitsubishi-produced CNC Systems purchased by Nissan. IMS contends that neither a stay nor an injunction is warranted.

HN2The "customer suit" exception permits stays where the first-filed action is brought against the customer of an offending manufacturer and a subsequent action

is brought involving the manufacturer itself. *Whelen Technologies, Inc. v. Mill Specialties, Inc.*, 741 F. Supp. 715 (N.D. Ill. 1990), citing *William Gluckin & Co. v. International Playtex Corp.*, 407 F.2d 177, 178 (2d Cir. 1969). This exception was created on the assumption that a manufacturer has a greater interest in defending patent infringement actions than a customer or end-user. Critical considerations to be weighed in deciding whether to stay or enjoin such suits are: whether or not all, or at least major, issues regarding the customers will be resolved by the second suit; and whether or not the customers have agreed to be bound by the results, including liability for damages, *8 flowing from the second suit. See *Katz v. Lear Siegler, Inc.*, 909 F.2d 1459, 1463 (Fed. Cir. 1990); and *Kahn v. General Motors Corp.*, 889 F.2d 1078, 1081 (Fed. Cir. 1989).

Mitsubishi argues that it is the real party in interest and that issues regarding the '754 Patent's validity and infringement by Mitsubishi-manufactured CNC Systems will be resolved in this suit against IMS. Mitsubishi contends that the Mazak parties, Machinery Systems, Fox Tool and the Nissan parties will have no liability should Mitsubishi prevail in this action. In the alternative, Mitsubishi maintains that even if its CNC System is found to infringe, any damages assessed against it would satisfy most if not all of IMS's claims. In other words, Mitsubishi expresses confidence that its suit, regardless of result, will provide "efficient and virtually complete relief" of all litigation revolving around Mitsubishi-manufactured CNC Systems and the '754 Patent. (Mitsubishi Reply at 5).

The Court finds, under the circumstances of this case, that judicial economy would not be served either by staying IMS's infringement claims against the Mazak parties, Machinery Systems or Fox Tool, in this case; or by *9 enjoining IMS's infringement claims against the Nissan parties in Case No. 95 C 5779 or against other Mitsubishi customers or end-users. First, it is undisputed that IMS has alleged distinct infringement claims against each of these parties and while Mitsubishi may indeed be a very important party, it is by no means the only interested Defendant. IMS seeks damages for the infringement of both apparatus and method claims. It is conceivable that Mitsubishi's CNC System could be non-infringing; however, its use by the other Defendants could infringe on the method claim of the '754 Patent. IMS's distinct method infringement claims against Mitsubishi's customers and end-users do not rest solely on whether or not Mitsubishi's product infringes. Thus, it is possible that some major issues involving the customers and end-users would not be resolved by this suit. For this reason, employing the "customer suit" exception would be inappropriate at this time.



Second, none of the named customer/end-user defendants have indicated HN3a willingness to be bound by judgment of this case. This fact strongly weighs against a stay or injunction because it increases the chance for duplicitous litigation. See *10 *Refac Intern., Ltd. v. IBM*, 790 F.2d 79, 81 (Fed. Cir. 1986) (affirming trial court's stay of suit against customers noting that they had agreed to be bound by the judgment of the suit between the patent holder and the manufacturer), *aff'd on recons.*, 798 F.2d 459 (Fed. Cir. 1986).

Third, little judicial efficiency will result from a stay or injunction. Since IMS has alleged distinct infringement against these Defendants which is interrelated with any potential infringement by Mitsubishi, discovery will necessarily involve all of these parties. These Defendants will therefore be intimately involved in the litigation regardless of a stay or injunction. In any event, it is inconceivable that the customers/end-users would totally ignore this case if a stay were granted. In this Court's experience, it is certainly reasonable to expect some degree of involvement by these defendants' attorneys, since evidence discovered and legal rulings could impact them at a later date. This Court finds that this fact weighs against a stay or injunction action at this time.

Fourth, the injunctive relief Mitsubishi seeks relating

to the Nissan parties and other customers defies precise definition *11 and would prove non-workable. While the injunction as to the Nissan parties is clearly limited as far as the parties involved are concerned, the extent of such an injunction is much more ambiguous. Since the Nissan parties are customers of Fanuc, they will necessarily be involved in litigation involving Case No. 95 C 5779. There will be no good method for defining the extent of the injunction. Even worse, in the case of other unnamed Mitsubishi customers, any injunction would likely either be too broad or too narrow in scope and very difficult to monitor. To construct an injunctive relief as to certain parties not named in this suit would create more problems than it would alleviate.

For these reasons, the Court finds that a stay or an injunction would not serve either the parties' or the Court's interests.

Conclusion

The Court hereby recommends denial of Mitsubishi's motion for a stay and/or an injunction.

MARTIN C. ASHMAN

United States Magistrate Judge

Dated: August 21, 1996.

AMERICAN ACADEMY OF SCIENCE, Plaintiff, v. NOVELL, INC.; BANK OF AMERICA, N.T.&S.A.; and
BANKAMERICA CORP., Defendants.

No. C-91-4300 EFL

UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA

1992 U.S. Dist. LEXIS 20145; 24 U.S.P.Q.2D (BNA) 1386

July 9, 1992, Decided

July 9, 1992, Filed

DISPOSITION: *1 The Court DENIES Novell's motions to sever, transfer and stay.

CASE SUMMARY

PROCEDURAL POSTURE: Defendant manufacturer moved to sever and transfer plaintiff's patent infringement claims against it from claims against defendant customers, and to stay plaintiff's suit against defendant customers until resolution of a later-filed action brought by defendant manufacturer seeking a declaration of patent invalidity.

OVERVIEW: Plaintiff brought an infringement suit alleging that defendant manufacturer induced defendant customers to infringe plaintiff's patent, and that defendant manufacturer had contributorily infringed the patent. Defendant manufacturer subsequently brought an action in a different forum seeking a declaration of the patent's invalidity; it then moved to sever and transfer the claims against it from the ones against defendant customers, and also to stay the action against defendant customers until the declaratory action was resolved. The court denied the motion, finding the "customer suit exception" to the rule that a first-filed suit should have priority over subsequent actions was inapplicable. First, the exception was clearly inappropriate for motions to sever and transfer generally. Second, a stay of plaintiff's action was improper since it was only attempting to hold defendant manufacturer liable for inducement/contributory infringement, and the declaratory suit would not resolve all claims of direct infringement against defendant customers.

OUTCOME: Motion denied, as "customer suit exception" to rule that first-filed suit should have priority over subsequent actions was clearly inappropriate for motions to sever and transfer, and stay of plaintiff's patent infringement suit under exception was improper since suit only sought to hold defendant manufacturer liable for inducement/contributory infringement.

CORE TERMS: customer, manufacturer, patent, infringement, declaratory relief action, severance, motions to sever, declaratory action, infringing, databases, judicial economy, first-filed, invalidity, real party in interest, patent infringement, transferred, distributed, convenience, infringe, patentee, lawsuit, prevail, declara-

tory judgment action, pending resolution, federal district, stayed pending, sever, unenforceability, noninfringement, applicability

LexisNexis(TM) HEADNOTES - Core Concepts

Patent Law > Infringement > Defenses

HN1The customer suit exception typically arises when related patent infringement actions are pending in different jurisdictions, the first brought by a patent owner against the customer of a manufacturer, and the second filed as a declaratory relief action by manufacturer against the patent owner. When the manufacturer seeks an injunction staying the first-filed suit pending the outcome of the second-filed declaratory relief action, it draws primarily on the doctrine of the customer suit exception in order to avoid the general rule that the first-filed suit should have priority over subsequent actions.

Patent Law > Infringement > Defenses

HN2Reference to the customer suit exception doctrine in relation to motions to sever and transfer is inapplicable and clearly inappropriate.

Patent Law > Infringement > Defenses

HN3Priority may be given to a second-filed declaratory relief action filed by a manufacturer when a first-filed patent infringement action is brought by a patent owner against a mere customer and the manufacturer of an allegedly infringing device is the real party in interest in a lawsuit against a mere customer. When a decision on the merits of an action between the manufacturer and the patent holder will resolve the major issues as to the manufacturer's customers, the decision to give priority to the manufacturer's action is proper. However, where a patentee has a separate interest in litigating against the customer, the real party in interest rationale for giving priority to the manufacturer's lawsuit is inapplicable. This principle appears particularly relevant in a situation where the patent owner seeks to hold the manufacturer liable solely on a theory of inducement/contributory infringement, claiming direct infringement only against the customer.

JUDGES: LYNCH

OPINIONBY: EUGENE F. LYNCH



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**OPINION: ORDER DENYING NOVELL'S MOTIONS
TO SEVER, TRANSFER AND STAY**

I. Introduction

On a motion set for hearing before this Court on May 29, 1992, defendant Novell moved to sever plaintiff's claims against Novell and transfer them to the federal district court in Utah where Novell's principal place of business is located. In addition, Novell moved to stay all claims against its indemnified customer, defendant Bank of America N.T.&S.A. ("BOA"), and BOA's parent Bankamerica Corporation ("BAC") pending resolution of the Utah action.

Based on the parties' briefs and oral argument, the Court understood Novell to be setting forth the following arguments: (1) that the claims against Novell in the present action should be severed and transferred on the basis of convenience, pursuant to Federal Rules of Civil Procedure 21 and 42 and 28 U.S.C. § 1404 and (2) that severance, transfer and a stay of the claims against BOA and BAC were warranted by application of the "customer suit exception." n1

----- Footnotes -----

n1 In its Memorandum in Support of Motion for Transfer, Novell argued that the claims against it "should be transferred under the 'customer suit exception.'" Memorandum at 9. In connection with the issue of severance, Novell relied upon a recent customer suit exception case entitled *Katz* when it stated that it would be a "waste of judicial resources and inconvenient for Novell's customers to be joined in trial during Novell's primary defense. Memorandum at 10.

----- End Footnotes -----

*2

Having considered the parties' arguments both in the briefs and at the hearing concerning severance and transfer on the basis of convenience, the court sees no justification to sever the case, nor does there appear to be a valid factual basis to transfer the entire case to Utah. Neither judicial economy nor the interests of justice would be served by such actions.

With respect to Novell's further argument that the customer suit exception justifies severance, transfer and a stay of the claims against BOA, at the May 29th hearing, the Court requested supplemental briefs from the parties on this issue. In the Court's view, the papers had not adequately addressed the applicability of

the customer suit exception to the situation at bar, in which a patent owner seeks to hold the manufacturer liable solely on a theory of inducement/contributory infringement, claiming direct infringement only against the customer.

Having read all the parties' papers, and for the reasons set forth more fully below, the Court finds that the customer suit exception is not appropriate, either procedurally or on the facts of this case.

Novell's motions to sever, transfer and stay the proceedings against its *3 customer BOA and BAC on the basis of the customer suit exception are therefore DENIED.

II. Background

Plaintiff American Academy of Science (AAS") filed this patent infringement action in the Northern District of California for alleged infringement of its U.S. Patent No. 4,714,989 (" '989 patent"). In its amended complaint, AAS alleges that Novell, a computer systems manufacturer, actively induces Novell's customers to make, use and sell "distributed databases" which infringe the '909 patent and that Novell contributorily infringes the '989 patent by marketing infringing software and hardware. n2 Plaintiff further alleged that defendant BOA directly infringed the '989 patent by its use of at least one hundred "distributed databases" in California.

----- Footnotes -----

n2 In its complaint and first amended complaint, AAS alleges direct infringement against Novell. However, at the hearing on Novell's motion to sever and transfer, AAS withdrew its claim of direct infringement against Novell.

----- End Footnotes -----

Novell subsequently filed a declaratory relief *4 action against AAS and its principal, Dr. Roger Billings, in the federal district court in Utah. In that action, Novell sought a declaration of patent invalidity, non-infringement and unenforceability, among others.

III. Discussion

A. Customer Suit Exception

HN1 The customer suit exception typically arises when related patent infringement actions are pending in different jurisdictions, the first brought by a patent owner against the customer of a manufacturer, and the sec-

ond filed as a declaratory relief action by manufacturer against the patent owner. When the manufacturer seeks an injunction staying the first-filed suit pending the outcome of the second-filed declaratory relief action, it draws primarily on the doctrine of the customer suit exception in order to avoid the general rule that the first-filed suit should have priority over subsequent actions.

Novell raised the doctrine of the customer suit exception in support of its motions to sever, transfer and stay. Having analyzed the relevant case law, it now appears to the Court that Novell's HN2reference to that doctrine in relation to its motions to sever and transfer was inapplicable and clearly inappropriate.

However, Novell *5 does have a declaratory judgment action pending in Utah. This fact properly sets the stage for a decision as to, whether the customer suit exception is applicable on the facts of this case. Thus, were the doctrine found to apply, the claims against BOA and BAC could be stayed pending resolution of Novell's declaratory relief action currently pending before the Utah district court.

The Court notes that Novell did not argue the applicability of the customer suit exception with respect to its declaratory relief action at the May 29th hearing. Instead, in the Court's view, Novell appeared to rely on the doctrine solely to buttress its argument for severance and transfer. The Court does note, however, that, buried in its Memorandum in Support of Motion to Transfer, Novell states that "under the clear authority of . . . Katz, the claims against Novell's "customers in this forum should be stayed pending the outcome of the Novell declaratory judgment action in Utah." Memorandum at 10-11. The Court believes it is proper, therefore, to address whether or not, on the facts of this case, the customer suit exception supports a stay of the claims against defendants BOA and BAC pending resolution *6 of Novell's declaratory relief action.

In the seminal customer suit exception case of Corp. v. Milgo Electronic Corp., HN3the First Circuit gave priority to the second-filed declaratory relief action filed by a manufacturer when the first-filed action was brought by a patent owner against a "mere customer." 553 F.2d 735, 737-38 (1st Cir. 1977). Underlying the court's rationale is the notion that "the "manufacturer of an allegedly infringing device is the real party in interest in a lawsuit against a mere customer." A.P.T., Inc. v. Quad Environmental Technologies Corp., Inc., 698 F. Supp. 718, 721 (N.D.Ill. 1988) (citing Codex, 553 F.2d at 737-30)). Thus, when a decision on the merits of an action between the manufacturer and the patent holder will resolve the major issues as to the manufacturer's customers, the decision to give priority to the manufacturer's action is proper. See Katz v. Lear

Siegler, Inc., 909 F.2d 1459, 1464 (Fed. Cir. 1990). Allowing the manufacturer's action to proceed in this manner comports with the Supreme Court's mandate that determinations *7 of priority between manufacturer and customer suits should be made with an eye toward "wise judicial administration, giving regard to conservation of judicial resources and comprehensive disposition of litigation" Kerotest Mfg. Co. v. C-O-Two Co., 342 U.S. 180, 185-86, 96 L. Ed. 200, 72 S. Ct. 219 (1952).

However, "where a patentee has a separate interest in litigating against the customer, the 'real party in interest' rationale for giving priority to the manufacturer's lawsuit is inapplicable." A.P.T., 698 F. Supp. at 721. This principle appears particularly relevant in a situation such as that presented in the case at bar, where the patent owner seeks to hold the manufacturer liable solely on a theory of inducement/contributory infringement, claiming direct infringement only against the customer. See, A.P.T., 698 F. Supp. at 722 (customer suit exception inapplicable where patentee of a process patent has particular interest in bringing suit against manufacturer's customers, the alleged direct infringers); Kahn v. General Motors Corp., 889 F.2d 1078, 1082 (Fed. Cir. 1082) (Fed. Cir. 1989) *8 (application of customer suit exception an abuse of discretion where outcome of declaratory action by manufacturer would not resolve direct infringement action against customer).

In the case at bar, judicial economy would not be served by staying the claims against BOA while Novell proceeds with its declaratory action in Utah. It may well be that the case against BOA will cease to exist should Novell prevail on its claims of patent invalidity or unenforceability. However, should the '989 patent be found valid and enforceable, even if Novell prevails on the issue of its noninfringement, there are other major infringement issues that will need to be resolved in the action against BOA. n3

----- Footnotes -----

n3 For example; AAS claims that about half of BOA's \$ 50 million infringing computer network systems have nothing to do with Novell's databases. The declaratory action by Novell will not resolve the infringement issues raised by these non-Novell systems.

----- End Footnotes -----

Because Novell's Utah action will thus have little, if

any, effect on issues *9 to be litigated in the action against BOA, the Court finds that the customer suit exception is inapplicable. Novell's motion to stay is therefore DENIED. n4

----- Footnotes -----

n4 The Court's ruling today in no way precludes the possibility of severing some of the issues for trial. In the interest of judicial economy, the Court may wish to set for trial the issues of patent ownership and/or invalidity before scheduling adjudication of the remaining issues.

----- End Footnotes-----

IV. Conclusion

For all the reasons set forth above, the Court DENIES Novell's motions to sever, transfer and stay.

IT IS SO ORDERED.

DATED: July 9, 1992.

EUGENE F. LYNCH

United States District Judge

LEXSEE 218 USPQ 722

Zemel Bros., Inc. v. The Dewey Electronics Corporation

No. 82-CV-103

United States District Court for the Northern District New York

1982 U.S. Dist. LEXIS 10201; 218 U.S.P.Q. (BNA) 722

May 21, 1982

LexisNexis (TM) HEADNOTES - Core Concepts:

Clayton Act, 15 U.S.C. § § 1, 2, 15 and 16. Jurisdiction for this action is predicated upon 28 U.S.C. § § 1338 n2 and 1337. n3

COUNSEL: [*1]

Guy D. Yale, and Prutzman, Kalb. Chilton & Alix, both of New Haven, Conn., (Rossi & Rossi, Utica, N.Y.), for plaintiff.

John F. Flannery, and Fitch, Even, Tabin, Flannery & Welsh, both of Chicago, Ill. (Bouck, Holloway & Kiernan, Albany, N.Y.), for defendant.

OPINIONBY:

MINER

OPINION:

Miner, District Judge.

I.

Plaintiff, Zemel Bros., Inc. (hereinafter "Zemel"), and defendant, Dewey Electronics Corporation (hereinafter "Dewey"), are manufacturers and distributors of snowmaking equipment for use at ski resorts. In this action, brought pursuant to 28 U.S.C. § 2201, Zemel seeks a declaratory judgment by this Court that three patents n1 held by Dewey are unenforceable, invalid and not infringed by Zemel. In addition, in count two of the complaint, Zemel seeks an award of treble damages for alleged anti-trust violations by Dewey of § § 1 and 2 of the Sherman Act and § § 4 and 16 of the

n1 The patents that are the subject of this action are United States Letters Patent Nos. 3,567,117, 3,703,991 and 3,733,029.

n2 28 U.S.C. § 1338 provides:

(a) The district courts shall have original jurisdiction of any civil action arising under any Act of Congress relating to patents, plant variety protection, copyrights and trade-marks. Such jurisdiction shall be exclusive of the courts of the states in patent, plant variety protection and copyright cases.

(b) The district courts shall have original jurisdiction of any civil action asserting a claim of unfair competition when joined with a substantial and related claim under the copyright, patent, plant variety protection or trade-mark laws.

n3 28 U.S.C. § 1337 provides: The district courts shall have original jurisdiction of any civil action or proceeding arising under any Act of Congress regulating commerce or protecting trade and commerce against restraints and monopolies. [*2]

Prior to the commencement of this action, Dewey had instituted four separate patent infringement actions

1982 U.S. Dist. LEXIS 10201, *; 218 U.S.P.Q. (BNA) 722

against companies which had purchased snowmaking equipment from Zemel. n4 In these "customer suits," Dewey alleged that both the apparatus and the process by which these ski resorts generate snow violate its rights in the three patents in question. Zemel has undertaken to defend its customers in these actions pursuant to a patent indemnity agreement executed in favor of each of the defendant customers. Before the Court is a motion by Zemel to enjoin Dewey from proceeding in the customer suits.

n4 The following suits have been initiated by Dewey against purchasers of snowmaking machines manufactured and sold by Zemel:

(1) Dewey Electronics Corp. v. Mt. Spokane Ski Are, Inc. and Riblet Aerial Tramway Co., No. C-81-616-JLQ (D. Wash.)

(2) Dewey Electronics Corp. v. Cascade Mountain Ski Area, No. 71-C-714 (W.D. Wis.)

(3) Dewey Electronics Corp. v. Magic Mountain Corp., No. 81-315 (D. Vt.)

(4) Dewey Electronics Corp. v. Titus Mountain, Inc., No. 81-CV-1139 (N.D.N.Y.)

II.

The question before this Court is whether this declaratory judgment action should be given [*3] priority over the earlier filed customer suits, and whether it would therefore be appropriate to enjoin these prior suits in the interests of the orderly administration of justice and judicial economy. It is the plaintiff's contention that enjoining the customer suits would be proper in this instance, since all of the essential issues relating to the infringement, validity and enforceability of the defendant's patents are present in this suit. Zemel further argues that the balance of convenience favors litigation in this forum, n5 that since the prior suits are customer actions, while this suit involves the two manufacturers, special circumstances exist which justify giving priority to this suit; and that Dewey has filed the customer suits solely for the purposes of harassment and forum shopping. Dewey, on the other hand, argues that the earlier filed suits should be given priority in accordance with the general rule, that the customers are "necessary parties" to a suit alleging violation of its method patents; and that Zemel has not offered evidence that it would be able to pay for damages suffered by Dewey because of its customers' infringement.

n5 Plaintiff contends that the balance of convenience favors this forum, since the

defendant is a New York corporation incorporated within this District, the plaintiff is a Connecticut corporation having its principal place of business in Middlefield, Connecticut, and substantially all of the sales by Zemel of allegedly infringing equipment occurred in Connecticut. [*4]

III.

In this Circuit, the first party to file a suit obtains no absolute right to priority, and this Court is vested with wide discretion in determining whether suits between different combinations of parties on the same basic issues should be allowed to proceed simultaneously in different forums. *Delamere Co. v. Taylor-Bell Co.*, 199 F.Supp. 55, 132 USPQ 252 (S.D.N.Y. 1961). Nevertheless, the first suit should be given priority in the absence of a showing of a balance of convenience in favor of the second action or unless there exist other circumstances which justify giving priority to the second suit. *Factors, Etc., Inc. v. Pro Arts, Inc.* 579 F.2d 215, 205 USPQ 751 (2d Cir. 1978), cert. denied, 440 U.S. 908 (1979); *William Gluckin & Co. v. International Playtex Corp.*, 407 F.2d 177, 160 USPQ 513 (2d Cir. 1969); *Mattel, Inc. v. Louis Marx & Co.*, 353 F.2d 421, 423, 147 USPQ 506, 506-07 (2d Cir. 1965), petition for cert. dismissed, 384 U.S. 948, 149 USPQ 906 (1966); *Coleco Industries, Inc. v. Empire Plastic Corp.*, 321 F.Supp. 146, 166 USPQ 347 (S.D.N.Y. 1970).

Under the "customer suit exception," priority is given to the later filed action when the earlier suit is against a customer [*5] of the alleged infringer, while the second suit involves the infringer himself. *William Gluckin & Co. v. International Playtex Corp.*, *supra*; *Delamere Co. v. Taylor-Bell Co.*, *supra*. Although the present action involves the manufacturers and the prior actions involve customers, n6 since the customer suits allege violations of a patented process, enjoining these prior action would not be appropriate. A patented process provides protection for an act or series of acts performed upon the subject matter (here, presumably water) to be transferred and reduced to a different state (here, snow). Am. Jur. 2d Patents § 8 (1972). Therefore, only the customers themselves may be found liable as direct infringers of the patented process of snow production. Zemel's liability in this regard can only be for contributory infringement, if it is found that it furnished machines to its customers which were particularly adapted to be used in performing the patented snowmaking process and that it supplied the machines with the intent that they be so used. See *Deller's Walker on Patents*, § 515 (1972). Since it is well settled that there can be no contributory infringement in the absence of direct [*6] infringement, *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365

1982 U.S. Dist. LEXIS 10201, *, 218 U.S.P.Q. (BNA) 722

U.S. 336, 128 USPQ 354 (1961), the customers are necessary parties to those prior actions. In addition, it is clear that the most convenient forum in which to determine whether a particular ski resort has engaged in a process for making snow which violated the defendant's patents would be in the district where the resort is located.

n6 There appears to be some question as to whether Zemel is a party to the Spokane action. According to Dewey, Zemel filed a motion to intervene in that action; however, the motion subsequently was removed from the docket when

Dewey consented to the intervention. Zemel then moved to quash service of a complaint served on it for lack of venue. A hearing was then held to decide whether Zemel had waived venue, and the court has taken the motion to quash under advisement.

Since Dewey's claims of violations of its process patents cannot be properly tried in this forum, and since Zemel has offered no evidence to support its contention that these actions were initiated solely for purposes of forum shopping and harassment, the motion to enjoin the customer suits is denied.

It is [*7] so Ordered.